WESTERN GAS

ovember
1929

20 Cents
the Copy

The Esperson Building in Houston, Texas, owned by Moody-Seagraves Company. This impressive structure is the home of United Gas Company.

PENNSYLVANIA STATE COLLEGE LIBRARY

A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES

PRINT IN BINDING

WANTED . . .
A Slogan for
NORDSTROM VALVES

◆ ◆ ◆ ◆

$500
IN CASH PRIZES

Write a Slogan about NORDSTROM VALVES. You may win $250.00. Nineteen cash prizes totaling $500 are offered for the best slogans submitted. The manufacturers are seeking a slogan not to exceed 10 words that will suggest the service or function, features or an outstanding advantage of Nordstrom Valves. The slogan "Won't leak, Won't stick" is now used . . . but you no doubt can think of several that are far better. If you are unfamiliar with Nordstrom Valve service ask your Plant Engineer . . . or write for descriptive catalog. But in any event send in your slogans. You have 19 good chances to win. In the event of a tie for any award, an equal amount will be paid to both.

RULES
of Slogan Contest

...Anyone is eligible except employees of Merco Nordstrom Valve Co. or affiliated companies.

Slogan must not exceed 10 words. Any number of slogans may be submitted by same person. Use coupon below or separate sheet of paper. Contest closes December 31, 1929

CASH AWARDS

First Prize . .	$250.00
Second Prize . .	100.00
Third Prize . .	50.00
4 Prizes, each . .	10.00
12 Prizes, each . .	5.00
TOTAL 19 CASH PRIZES	$500.00

» » »

JUDGES

The judges will consist of one official of the Merco Nordstrom Valve Company, one representative of a well known trade publication organization and one advertising counsellor.

FILL IN THIS ENTRY BLANK AND MAIL

MERCO NORDSTROM VALVE CO.,
343 Sansome St., San Francisco, Calif.

I submit the following slogan(s) pertaining to Nordstrom Valves:

_____

_____

_____

_____

Name_____

Address_____

City_____ State_____

(Use separate sheet if insufficient space above)

Lubricant Seals the Valve Against Leaks

NORDSTROM VALVES are of the plug cock type, with lubrication and lifting features that make them easy and sure of operation. A stick of special "Merco" Lubricant is inserted under the lubricant screw. The latter, when turned, forces the lubricant down and around the plug. Automatic lifting effect of the lubricant insures freedom from sticking and allows access of the lubricant to the seat. Fluid and other material within the line cannot pass around the plug and leak out, or lodge in the seat. The plug is always easy to turn. Made in types and sizes to meet conditions in all industries.

Nordstrom Valves are made in 2, 3 and 4-way types. Sizes ½" to 30"...for high or low temperatures...for high or low pressures. Special "Merco" lubricant for special conditions.

Merco Nordstrom Valve Co.
SUBSIDIARY OF THE MERRILL COMPANY
Engineers - Manufacturers

Atlanta: Healey Bldg.
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Chicago: 176 W. Adams St.
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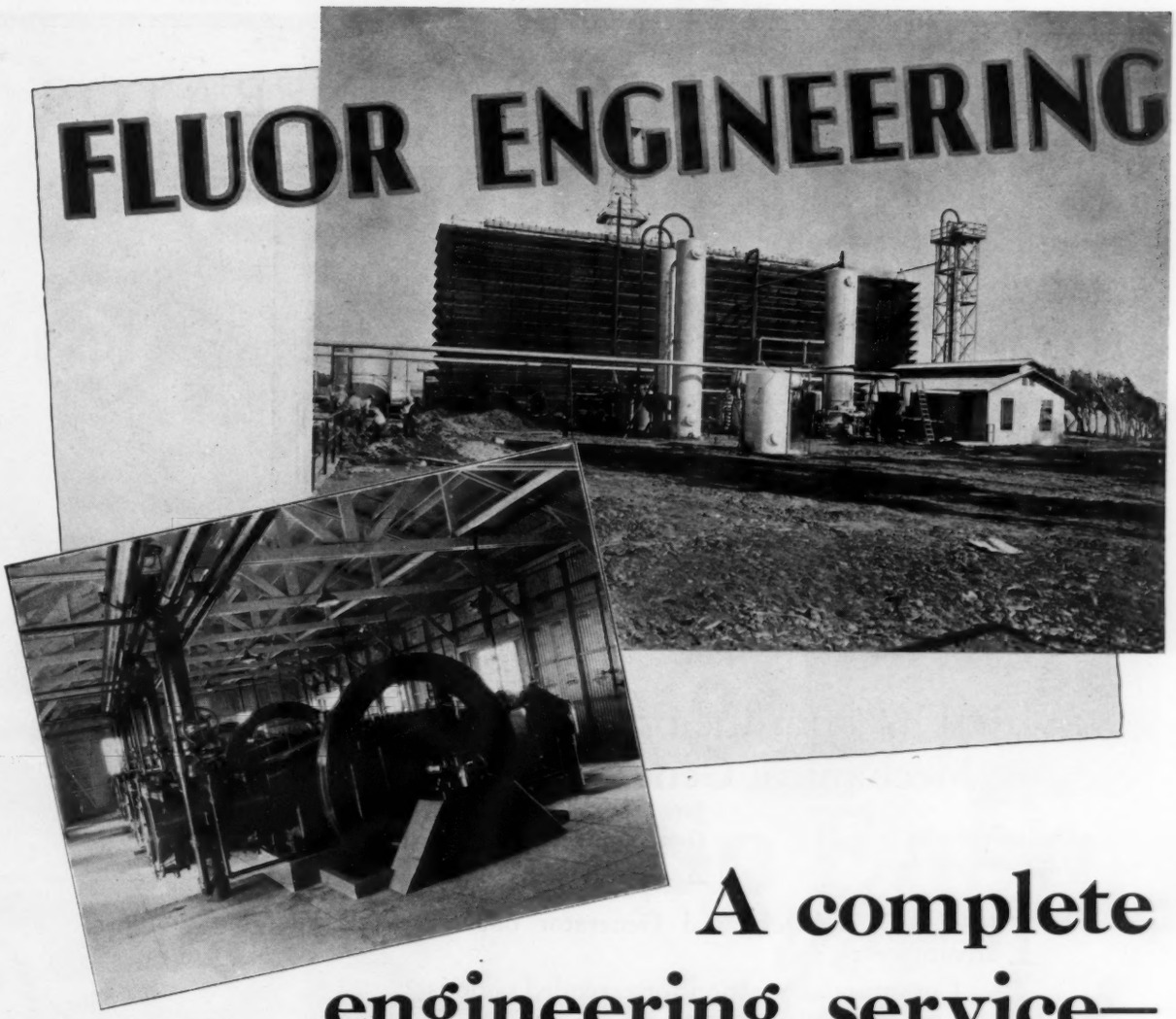
New York: 11 W. 42nd St.
Pittsburgh: Clark Bldg.
Portland: Buyers Bldg.
San Francisco: 343 Sansome St.

AGENCIES IN PRINCIPAL CITIES
***Factories*—Oakland, California; and Belleville, New Jersey**
***Canadian Manufacturers*—**
Peacock Bros., Ltd., Montreal, Cobalt, Winnipeg, Vancouver
***England*—Audley Engineering Co., Ltd., Newport, Shropshire**
Buenos Aires, Argentine—General Electric, Soc. Anon., Victoria 618 Esq. Peru.



A complete engineering service—

(1) Consultation (3) Installation
(2) Design (4) Operation

Covering complete gas compressor stations, gasoline absorption plants, cooling systems, boiler plants, pump stations and general concrete and machinery installations.

You can profit by FLUOR EXPERIENCE

THE Fluor CORPORATION, LTD.
(Successors to Fluor Construction Co.)

909 E. 59th St., Los Angeles, California

Tulsa, Okla.	Houston, Texas	New York, N. Y.	Dallas, Texas
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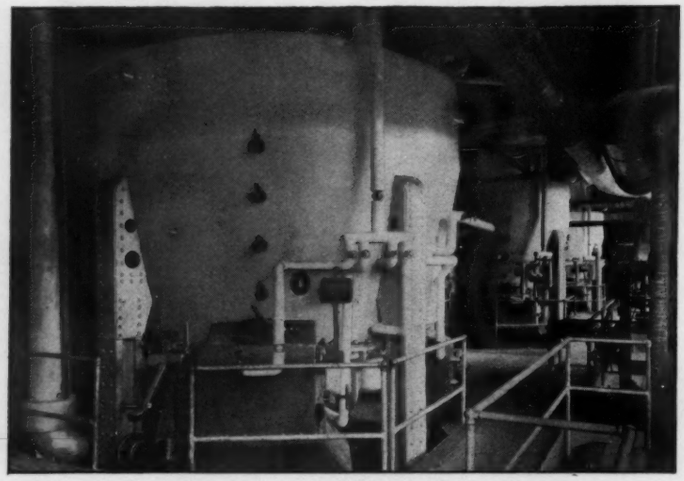
U. G. I. MECHANICAL GENERATOR



Three U. G. I. Mechanical Generators at Philadelphia Gas Works Company

Results from the operation of three U. G. I. Mechanical Generators at Philadelphia

Daily Capacity	*Generator Fuel per M.*	*B. t. u. of Gas*
15,000,000 cu. ft.	*25 lbs.*	*530*

THE U. G. I. Mechanical Generator offers the following important advantages:

Continuous operation for extended periods
Low fuel consumption
Low carbon loss in ash
Low maintenance
Heat otherwise lost recovered as steam
Bituminous coal may be used as fuel

The U. G. I. Mechanical Generator is self-clinkering, and with the U. G. I. Automatic Charger, provides a completely automatic controlled and operated water gas set from fuel bin to ash car.

Fifteen U. G. I. Mechanical Generators and nine U. G. I. Automatic Chargers have been installed or are now in process of installation.

THE U. G. I. CONTRACTING COMPANY

DIVISION OF

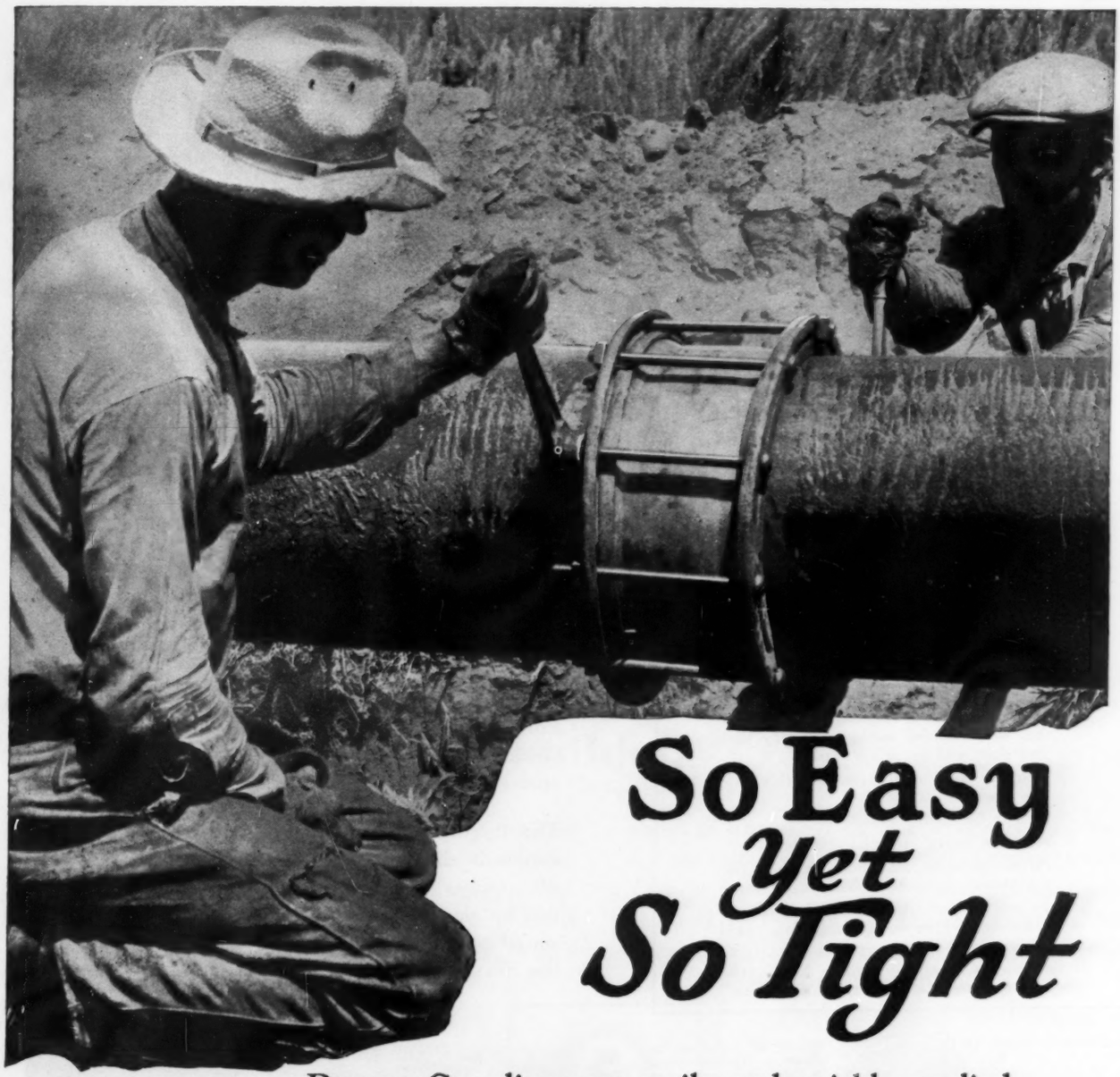
UNITED ENGINEERS & CONSTRUCTORS

INCORPORATED

DWIGHT P. ROBINSON, PRESIDENT

Chicago Broad and Arch Streets, Philadelphia New York

MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED



So Easy *Yet* So Tight

Dresser Couplings are easily and quickly applied. They take care of expansion and contraction and will remain permanently tight.

S. R. DRESSER MFG. CO., Bradford, Pa.

DRESSER Couplings Dominate

Before you buy an Orifice Meter

Ask yourself these questions

1. Will the meter be easy for my field men to clean?
2. Is it easy to zero?
3. Has the Instrument a uniform scale chart?
4. Does the pen travel uniformly over the entire chart range?
5. Has the meter a machined steel float that is powerful enough to defy dirt and that will not clog easily?
6. Can my field men assemble this orifice meter quickly?
7. Can it be easily read?
8. Are the parts interchangeable?
9. After installation, how about the maintenance cost? Will it be low?
10. Is the meter ACCURATE—without inherent error—requiring no field calibration?

If you buy a Foxboro Orifice Meter, the answers to these ten questions are "yes."

Foxboro meets every requirement

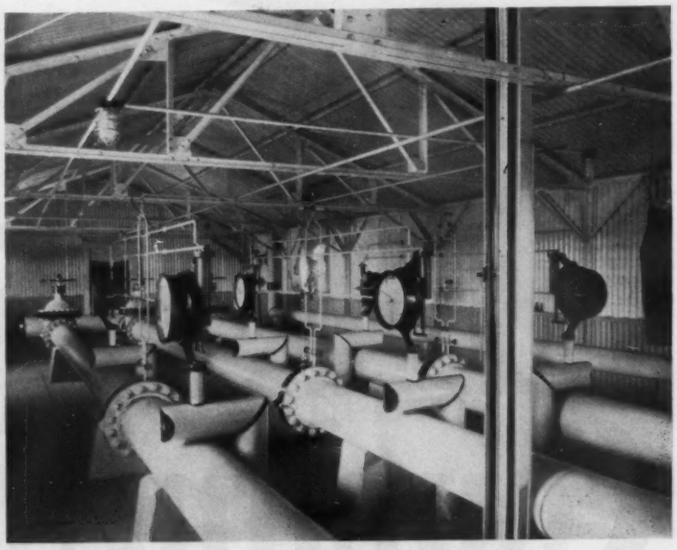
Foxboro Orifice Meters meet every requirement of an orifice meter that is to do its job efficiently. In fact, leading oil and gas engineers specified what they wanted—and Foxboro built the Instruments.

For nineteen years the charts of Foxboro Orifice Meters have been accepted as the accurate records of wet or dry gas flow.

The Foxboro Orifice Meter is made in three standard differential ranges of 20, 50 and 100 inches of water. A Foxboro Engineer will be glad to tell you just which type is best suited to your needs. Write this engineer at the nearest Branch Office.

The Foxboro Guarantee, sealed to each Recording and Controlling Instrument. This guarantee assures you of years of accurate, dependable service.

Photo at right shows Foxboro Orifice Meters measuring gas at the North Station of the Oklahoma Natural Gas Company, Oklahoma City, Oklahoma.



THE FOXBORO COMPANY
Neponset Ave., Foxboro, Mass., U. S. A.

Western Offices:
Los Angeles, 443 S. San Pedro St.
San Francisco, 461 Market St.
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New York	Chicago	Atlanta	Cleveland
Detroit	Boston	Pittsburgh	Rochester, N. Y.
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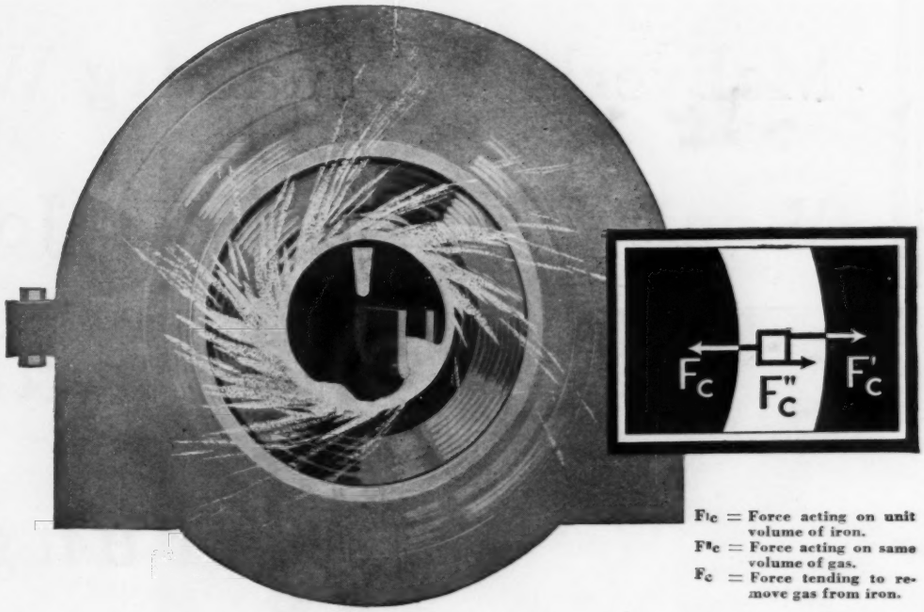
J. E. Treacy, Strada Golesti No. 9, Ploesti, Roumania

Agents for Robinson Patented Orifice Flange Fittings

FOXBORO
REG. U. S. PAT. OFF.
THE COMPASS OF INDUSTRY

INSTRUMENTS *for* CONTROLLING, RECORDING *and* INDICATING TEMPERATURE, FLOW, HUMIDITY and PRESSURE



F'_c = Force acting on unit volume of iron.
F''_c = Force acting on same volume of gas.
F_c = Force tending to remove gas from iron.

In the manufacture of deLavaud Pipe, a force 40 times greater than gravity drives out impurities and builds a 25% stronger pipe.

deLavaud Pipe is made by pouring molten iron into a rapidly revolving cylindrical mold. Centrifugal force holds the metal against the sides of the mould and drives out impurities with a force, which every engineer knows, is 40 times greater than gravity.

Thus deLavaud Pipe is remarkably free from slag and weakening gas bubbles. And because it is actually cast under the pressure, resulting from the force $F_c = \frac{Wv^2}{gR}$ the pipe wall is dense and strong, allowing a greatly increased carrying capacity.

The results of strength tests performed on deLavaud Pipe are little short of amazing. In tests recently conducted by an outside authority, deLavaud results (when compared with good pit cast pipe) showed 100% greater tensile strength, 65% greater transverse strength and 25% greater bursting strength.

Cast iron pipe made by this Company bears the "Q-check" trademark of The Cast Iron Pipe Research Association.

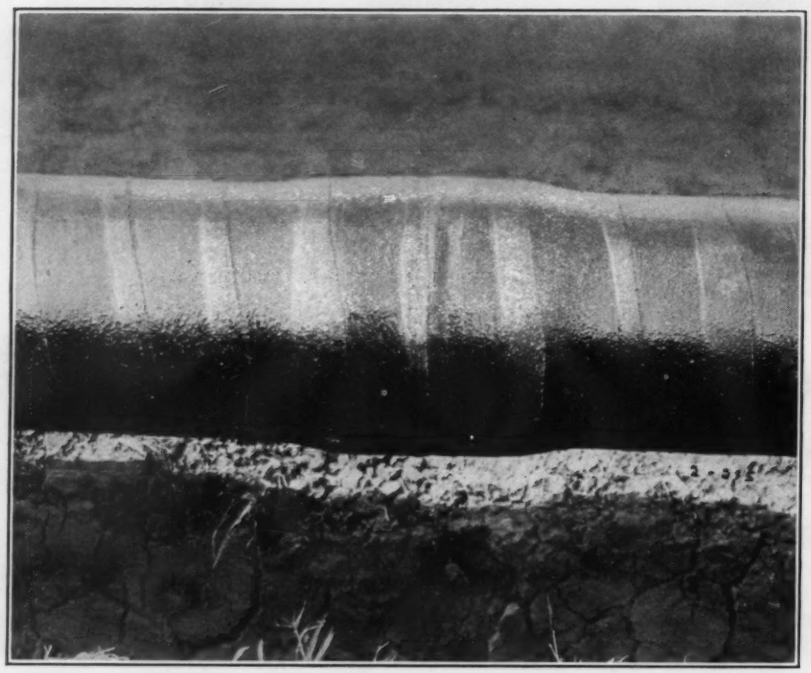
Engineers and contractors who want a gas or water pressure pipe of greater durability and a greater factor of safety will find it a satisfaction and a surprising economy to specify deLavaud Pipe.

Let us send you the deLavaud handbook. Here you will find all the facts and figures about deLavaud Pipe, including types of joints and dimension tables.

United States Pipe and Foundry Co., Burlington, New Jersey

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

McEverlast Osnaburg Wrap Won't Wrinkle Over Joints



Flexible!

Tough!

Durable!

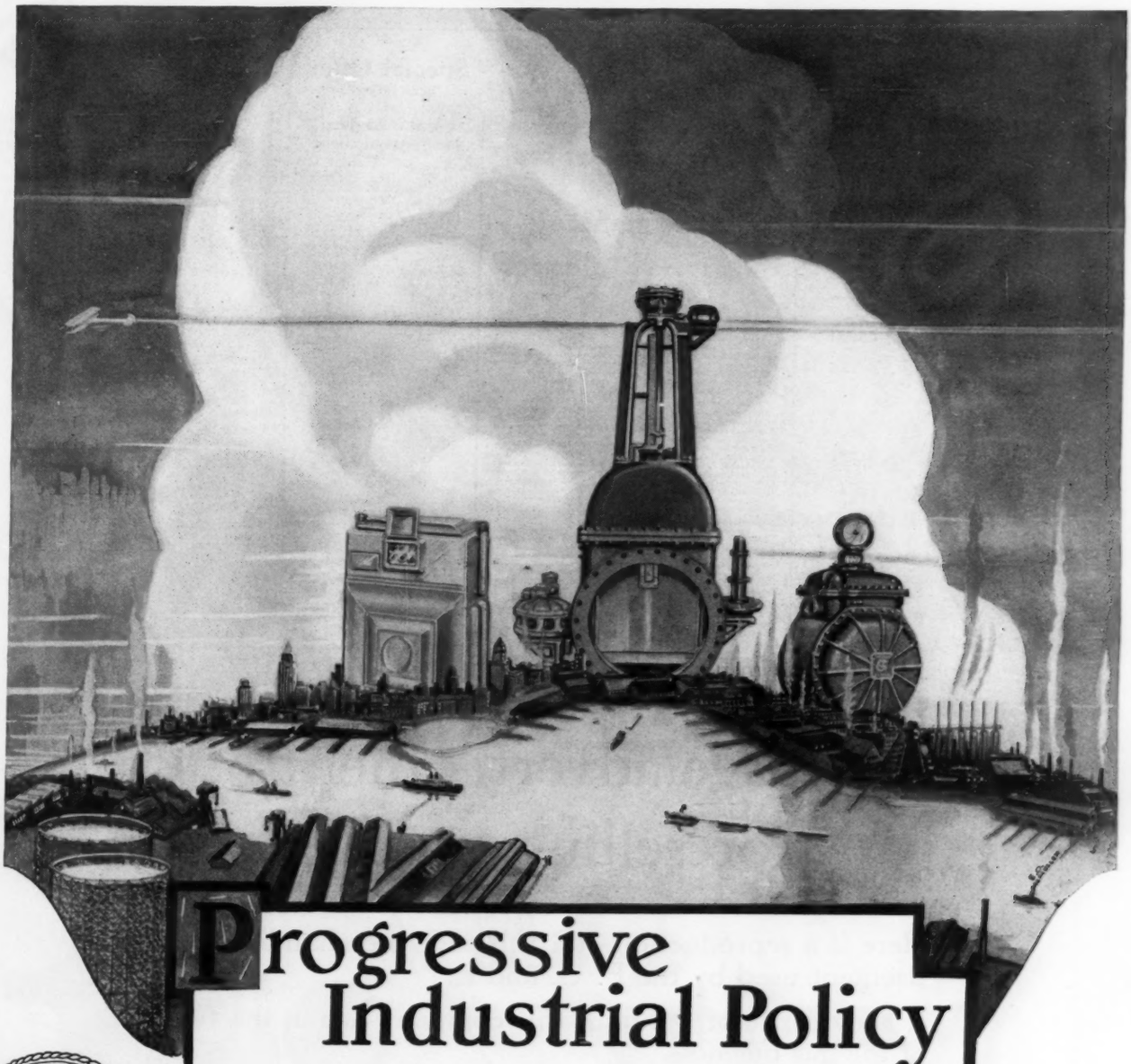
See how closely the wrap fits over this double bell end weld on one of the Gulf Pipe Line Co.'s lines near Spindletop. Not a sign of a wrinkle or pocket!

Using this wrap, McEverlast coatings resemble the carcass of an automobile tire in elasticity and toughness—a toughness that resists soil stresses and stops corrosion in its tracks!

Write for informative booklet on pipe line protection.

McEVERLAST, INC.
[THREE]

111 West Seventh St., Los Angeles, Calif.
35 E. Wacker Drive, Chicago, Ill. 1754 Graybar Bldg. New York, N. Y. 1314 Magnolia Bldg. Dallas, Texas
Offices in Principal Cities



Progressive Industrial Policy

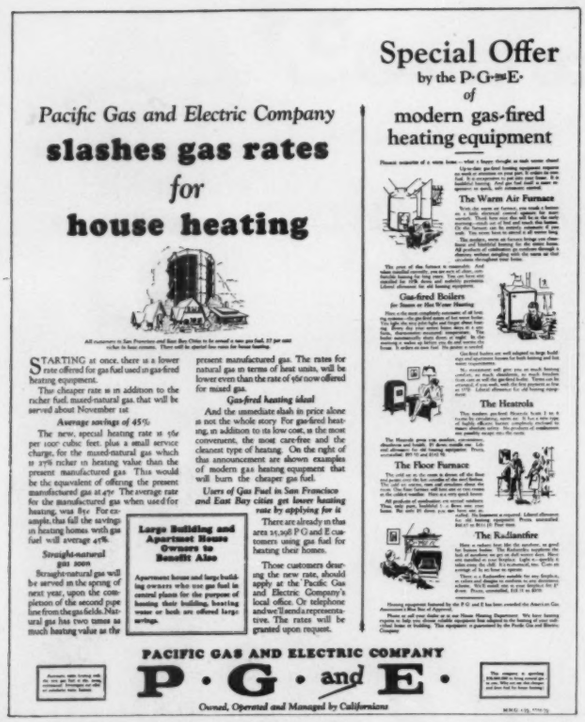
Promotes constant inquiry and activity directed at improvements in product and service. American Meter Company is operated under this policy without experiment at customer's expense. It has brought the beneficial result of an authoritative Leadership in Gas Measurement Engineering.

PACIFIC METER WORKS · PIONEERS IN THE WEST ·

Established 1901 *for Pacific Coast Requirements*

AMERICAN METER CO
MEASUREMENT ENGINEERS
CUBIC FEET

San Francisco **Los Angeles** **Portland**



Special Offer
by the P·G·and·E·
of
modern gas-fired
heating equipment

Pacific Gas and Electric Company
slashes gas rates
for
house heating

STARTING at once, there is a lower rate offered for gas fuel used in gas-fired heating equipment.

The cheaper rate is in addition to the richer fuel, mixed-natural gas, that will be served about November 1st.

Average savings of 45%

The new, special heating rate is 55¢ per 100 cubic feet, plus a small service charge, for the mixed-natural gas which is 25% richer in heating value than the present manufactured gas. This would be the equivalent of offering the present manufactured gas at 41¢. The average rate for the manufactured gas when used for heating, was 81¢. For example, this fall the savings in heating homes with gas fuel will average 45%.

Straight-natural gas soon

Straight-natural gas will be served in the spring of next year, upon the completion of the second pipe line from the gas fields. Natural gas has two times as much heating value as the present manufactured gas. The rates for natural gas in terms of heat units, will be lower even than the rate of 55¢ now offered for mixed gas.

Gas-fired heating ideal

And the immediate slash in price alone is not the whole story. For gas-fired heating, in addition to its low cost, is the most convenient, the most care-free and the cleanest type of heating. On the right of this announcement are shown examples of modern gas heating equipment that will burn the cheaper gas fuel.

Users of Gas Fuel in San Francisco and East Bay cities get lower heating rate by applying for it

There are already in this area 70,000 P G and E customers using gas fuel for heating their homes.

Those customers desiring the new rate, should apply at the Pacific Gas and Electric Company's local office. Or telephone and we'll send a representative. The rates will be granted upon request.

Large Building and Apartment House Owners to Benefit Also

Apartment house and large building owners who use gas fuel in central plants for the purpose of heating their buildings, heating water or both are offered large savings.

The Warm Air Furnace

Gas-fired Boilers
for Steam or Hot Water Heating

The Heatrola

The Floor Furnace

The Radiantfire

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and·E·
Owned, Operated and Managed by Californians

Full page advertisement used for selling gas fuel

Here is a reproduction of a full-page merchandise advertisement used by the P. G. and E.

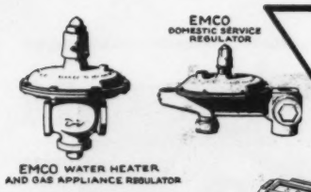
It is evidence of the faith this company has in the future of the gas business.

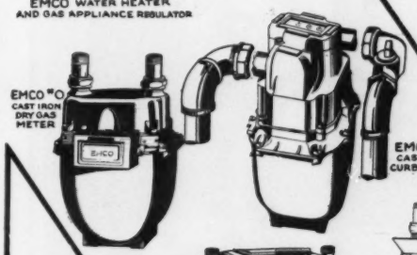
But the faith of gas men is not the entire story. How about the public?

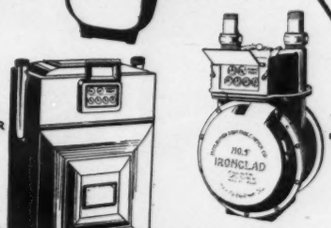
The public's response to this advertisement was excellent. The public is showing faith in gas fuel by installing gas-fired heating equipment in their homes.

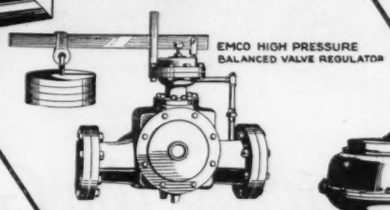
And now that a finer and cheaper fuel is being served to Northern California, every one selling gas appliances can chart a rising business curve.

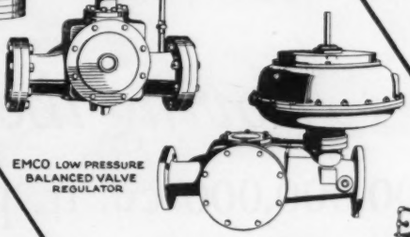
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and·E·
Owned · Operated · Managed
by Californians

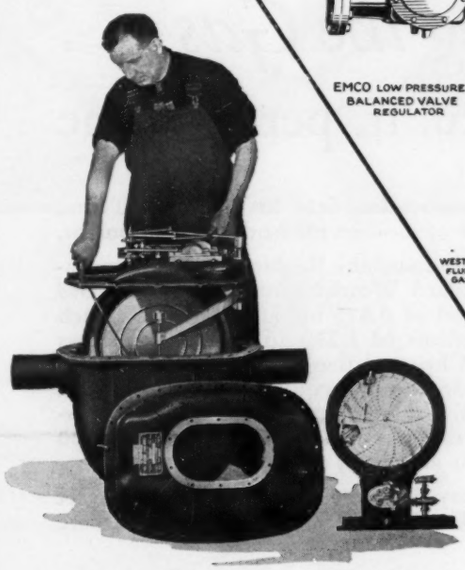




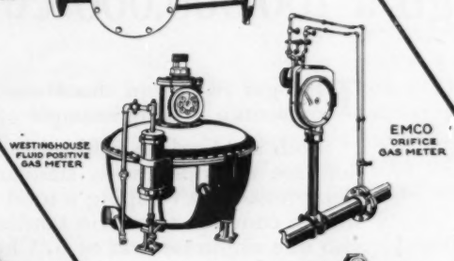


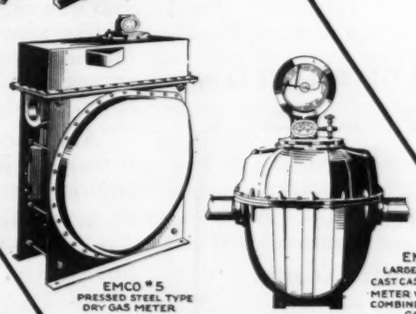






EMCO Large Capacity Gas Meter equipped with EMCO Combined Record Gauge





You Can Leave an EMCO in the Line

The outer casing consists of the body, cover and top index plate. The moving parts, that is diaphragms, flag, flag arms, tangent and valves, are attached and built into the valve plate. The design of EMCO Large Capacity Meters makes it possible to make any adjustments or repairs without removing the meter from the line. This feature means reduced upkeep costs. Like all EMCO meters and regulators parts are interchangeable.

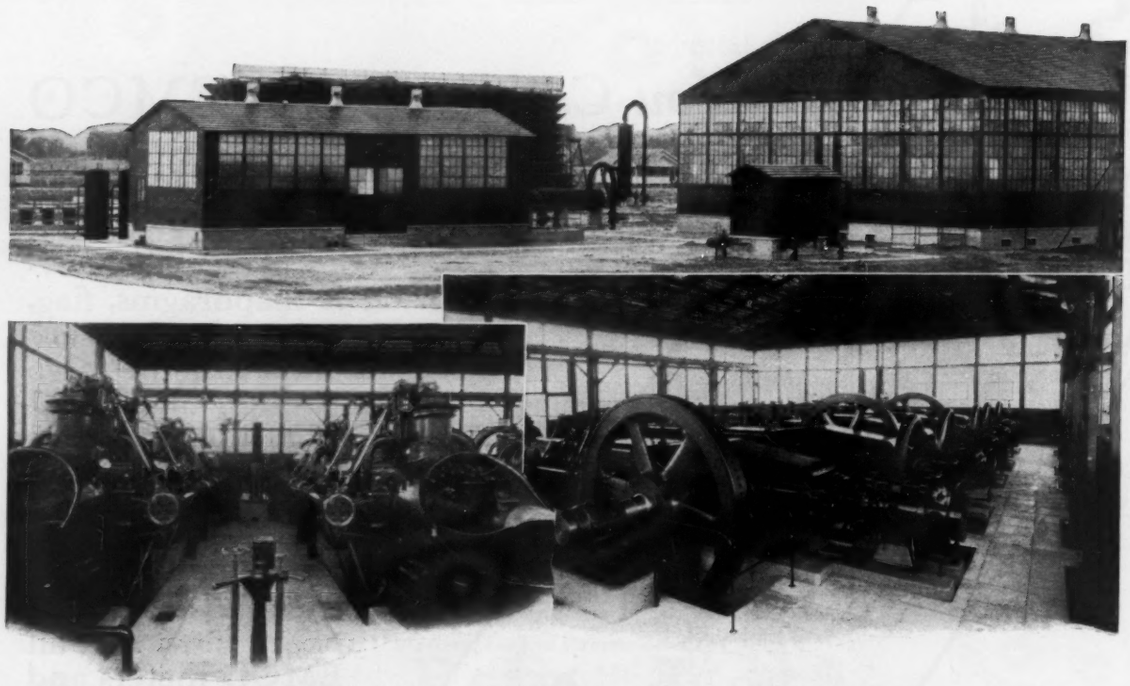
EMCO

—wherever you go!

PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS TULSA SEATTLE KANSAS CITY SALT LAKE CITY



Guthrie station, on the Monroe-Memphis gas line, and its Worthington Gas Engine Gas Compressors

Moving the Gas . . .

through a 100,000,000 cu. ft. per day line

THE gas line from the Monroe, La., field to Memphis, Tenn., presents a striking example of modern methods and equipment.

Both the Guthrie field station and the Benoit intermediate station are equipped with standard Worthington Gas Engine Gas Compressors, developing a total of 6,875 hp. at 125 R.P.M. Each station contains two twin tandems of 1,250 hp. each, Guthrie has also one single tandem of 625 hp. and Benoit two single tandems of like power. All are 24 x 36 engines, equipped with 14½-inch diameter compressor cylinders, and have a maximum working pressure of 400 lbs. The line, with a capacity of 80,000,000 to 100,000,000 cu. ft. per day, serves Memphis and many intermediate towns.

A. M. Lockett and Company built the line under sub-contract from Ford, Bacon and Davis. The Ralph E. Davis organization were engineers on the line.

Write for interesting data on the advantages of Worthington standardized interchangeable gas engine gas compressors for gas line service.

WORTHINGTON

PUMPS
COMPRESSORS
CONDENSERS *and* Auxiliaries
DIESEL ENGINES
GAS ENGINES
FEEDWATER HEATERS
WATER, OIL *and* GASOLINE METERS

Literature on Request

WORTHINGTON PUMP AND MACHINERY CORPORATION

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WORTHINGTON

SGR-2

Much of This Can Be Avoided

The heavy expense of replacing leaky services due to corrosion can be largely avoided in the future. All services can now be protected against corrosion for a lifetime of uninterrupted service. There is, in other words, a new method which permits small diameter pipes to be effectively coated with ***Bitumastic Enamel*** at small expense.

The equipment is simple and cheap. The labor involved is almost negligible. The results obtained can be compared only with the proven protection from corrosion that ***Bitumastic Enamel*** has given to the great natural gas trunk lines of America.

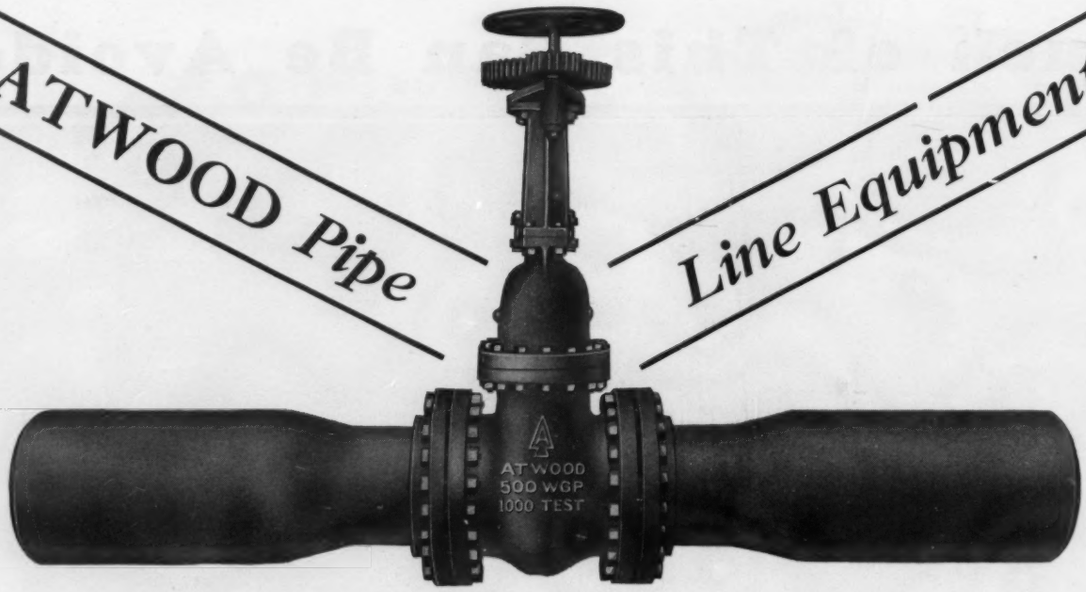
In your own plant you will find opportunities to effect maintenance economies by using this new method. Send for bulletin 272-A. It is full of valuable information for the Distribution Engineer.

BITUMASTIC
REG. U.S. PAT. OFF
ENAMEL

Wailes Dove-Hermiston Corporation
17 Battery Place, New York

2464 Enterprise St., Los Angeles, Calif. 345 Vermont St., San Francisco, Calif.
Philadelphia Cleveland Chicago Houston Tulsa San Francisco

ATWOOD Pipe Line Equipment



ATWOOD Swedged Welding Nipple, swedged from 22" to 18". Advanced type Gas valve, 500 lbs. working pressure, tested hydrostatically to 1000 lbs., ATWOOD High Tensile Iron body, O.S.& Y., spur gear operated.

SWEDGED Welding Nipples • Welded River Crossings • ATWOOD Joints • Piping of every description • designed • fabricated • erected • Valves for every Oil and Gas service • Fittings • the ATWOOD Line is complete.

Many of the most complex problems of Pipe Line Control have been solved by ATWOOD Engineering Service—and solved practically by ATWOOD design—made *trouble-proof* after the line has been put in operation by ATWOOD-Manufactured equipment.

No matter how tough—if there is a way to do a Pipe Line job—ATWOOD Service will find it and design accordingly the most efficient and economical installation. Feel free to call upon our Engineering Service at any time concerning any job you may have under consideration.

Trade Mark
ATWOOD

Send today for ATWOOD OIL and Gas Valve Booklet 100

PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO.
PITTSBURGH ~ PENNA.

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New York City	30 Church Street
Chicago, Ill.	80 East Jackson Blvd.
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Dallas, Texas	1314 Southwestern Bldg.
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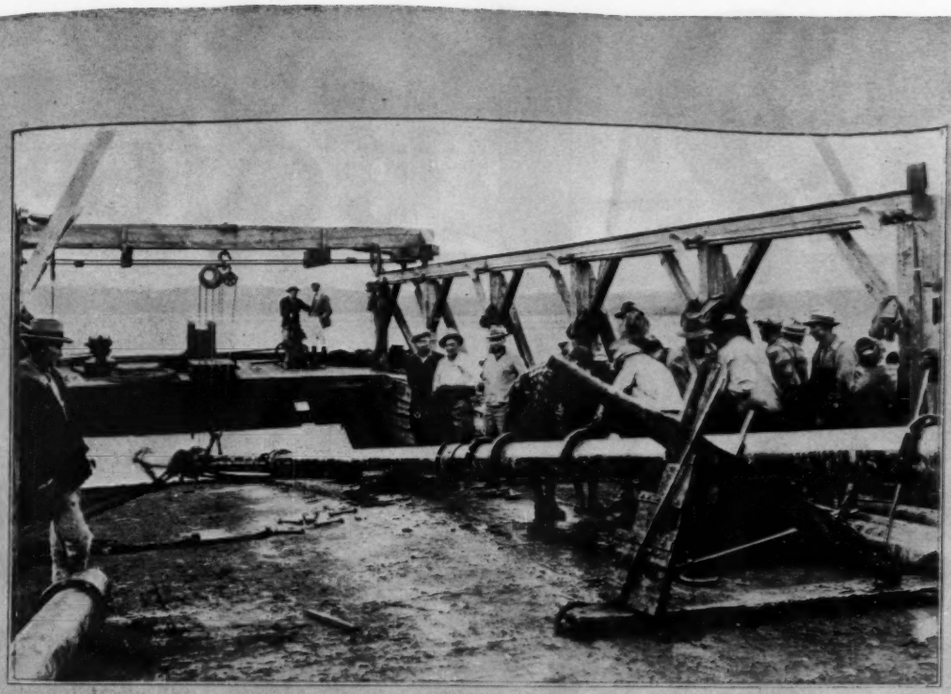
Atlanta, Ga.	Moore-Broach Eng. Co., Forsyth Bldg.
Philadelphia, Penna.	R. J. Crozier Co., 10 South 18th Street
Los Angeles, Cal.	John G. Bell Co., 712 East Sixth Street
Toronto, Canada	A. G. Hill, 45 Jarvis Street

Founders Since 1825 Valves and Fittings Since 1866



Laying water lines at Mississippi river crossing

208 Miles of 18-Inch Gas Line in 92 Days Is Record on Memphis Project

By W[illegible] P. H[illegible]*

STARTING in Louisiana, this 208-mile 18-inch gas line reached Memphis in 92 days. Laying the line involved the crossing of cotton fields, gumbo, swamps, the Mississippi and four other rivers; nine railroads; canals, ditches and bayous—about the full range of experiences that would likely be encountered in laying a pipe line anywhere.

While much credit belongs to the skill of workmen and the wise supervision of the job, still a share may go to an ever-ready and adaptable pipe whose characteristics—more particularly strength, ductility and well-finished ends, meant much in the general success of laying the line.

There is much satisfaction in knowing that when difficult installation problems are encountered which place extra strain on the pipe, such as, crossing rivers and deep ravines, that the pipe can be counted upon to meet these special conditions in a thoroughly satisfactory manner. The extensive use of NATIONAL for lines involving unusual engineering problems is substantial evidence of the reliability of this pipe for special and difficult conditions—one of the reasons why NATIONAL is

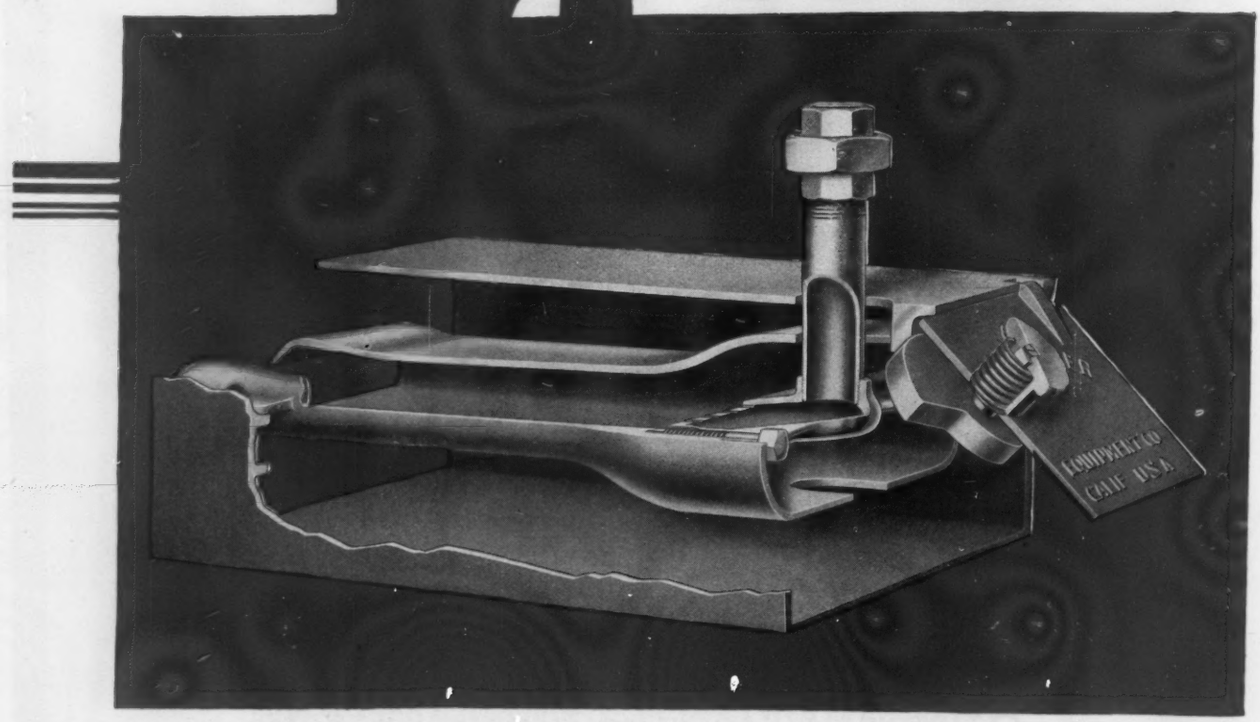
AMERICA'S STANDARD PIPE FOR GAS LINES

NATIONAL TUBE COMPANY · Pittsburgh, Pa.

Subsidiary of United States Steel Corporation

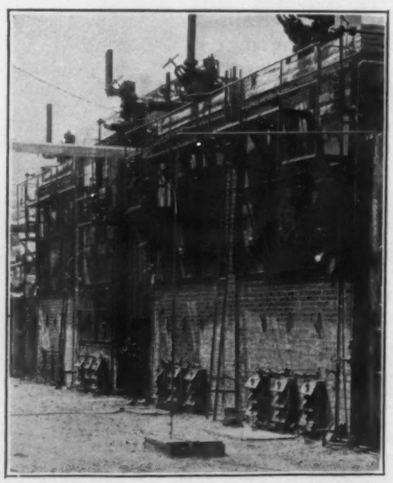
NATIONAL PIPE

21 BOILER



..BY N.G.E. GAS BURNERS..TYPE A

. . . product of 9 years' engineering research . . . and the experience of the pioneer Western gas burner manufacturer!

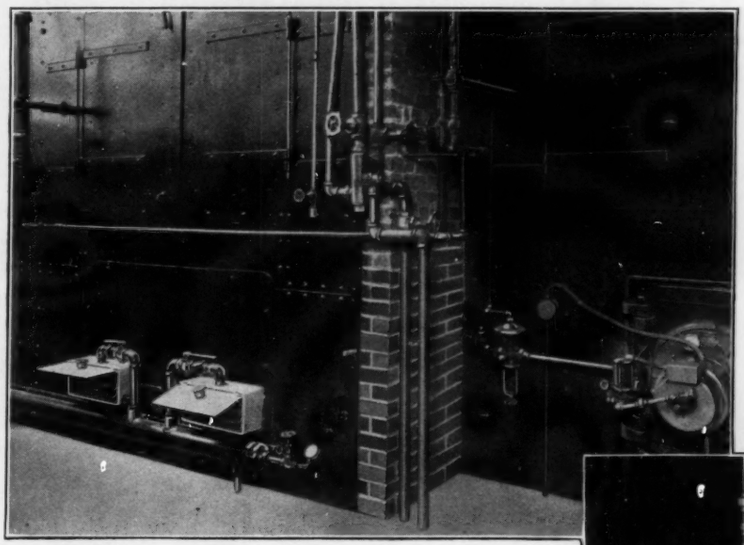


N. G. E. Gas Burners Type A in these 500 h. p. watertube boilers . . . other conditions unchanged . . . increased output 81.5 per cent

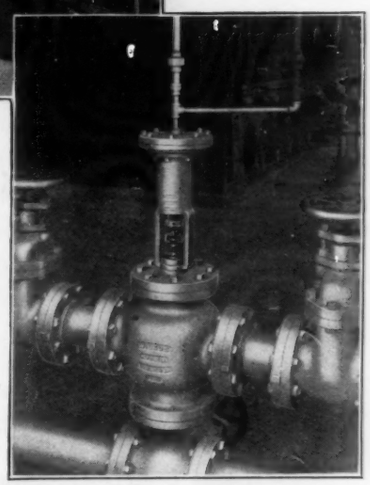
NEW EFFICIENCY in boiler operation... higher ratings from the same boilers and the same gas pressure . . . longer life for boiler, tubes, and furnace . . . new ability to carry peak or valley loads under automatic regulation . . . new freedom from all of the 21 disadvantages common to other types of burners . . . proved by the most searching comparative tests!

The new descriptive booklet, just off the press, is more than a catalogue of burners. It has been planned as a handbook of practical data for every man operating boilers, power plants, or furnaces. Your copy gladly sent on request!

OPERATION PROBLEMS SOLVED!



N. G. E. Gas Burners and Wilgus Regulators were selected for the first natural gas industrial installation in San Francisco, in the 150 h.p. return tubular boilers of the San Francisco Packing Corporation. Note the simplicity of gas-fired installation



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Gas Fuel Regulators in connection with the N. G. E. Gas Burners *automatically* adjust the fuel supply to meet steam demands, without attention from plant operator. Recent comparative tests by large users indicated 50 per cent closer regulation and 20 per cent larger full open capacity for Wilgus over other regulators tested. Use this effective combination for maximum boiler output; minimum fuel and upkeep cost!

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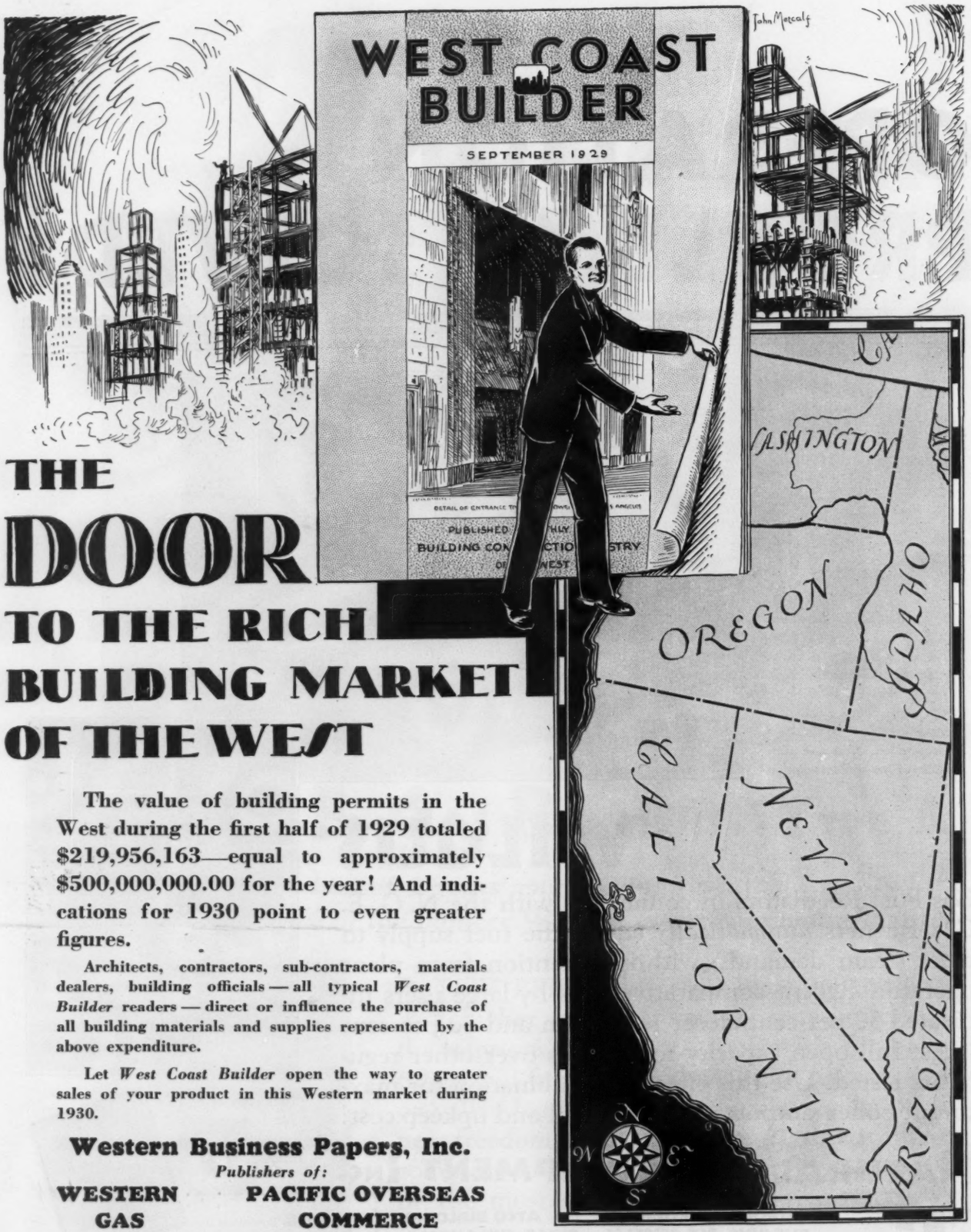

THE DOOR TO THE RICH BUILDING MARKET OF THE WEST

The value of building permits in the West during the first half of 1929 totaled $219,956,163—equal to approximately $500,000,000.00 for the year! And indications for 1930 point to even greater figures.

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Let *West Coast Builder* open the way to greater sales of your product in this Western market during 1930.

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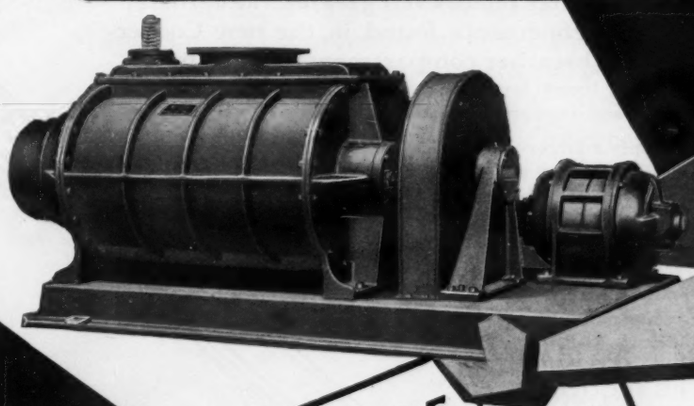

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In the above city are countless Roots Pumps, Blowers and Meters, giving perfect service even though their performance is unwatched.

Roots Units can be depended upon to handle any job for which they are specified, with maximum efficiency and minimum power and upkeep.

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85-170 B.H.P. ENGINE COMPRESSOR

BUILT AS SINGLE OR TWIN UNIT

TYPE 80

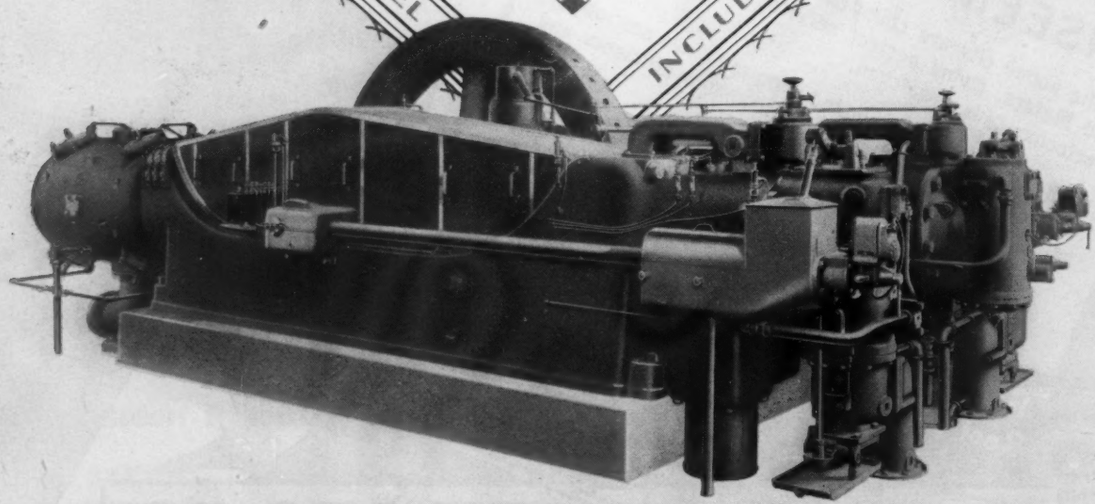
ALTHOUGH existing types of Cooper-Bessemer engine compressors are performing in a manner thoroughly satisfactory to owners and operators, Cooper-Bessemer engineers are constantly seeking ways to make these units still better. Out of scientific research, laboratory tests, advanced engineering, modern equipment and materials, has been developed a new and improved Type-80—an engine compressor that offers even greater value than the models preceding it. Some of the refinements found in the new Cooper-Bessemer Type-80 are: a new and better breather compartment; special heat-resisting exhaust valves; longer power cylinder liners; larger inlet valves; improved exhaust chambers; better water cooling throughout, and more efficient compressor cylinder valves.

The New Type-80 is looked upon as simply a larger Cooper-Bessemer built smaller—with every detail cared for to insure lasting, economical and dependable operation. It is the 4-cycle, horizontal, direct-drive type, built as a single cylinder—85 B.H.P., and as a twin cylinder—170 B.H.P. Its chief applications are air and gas lift, gas boosting, gasoline extraction from gas, gas compressing, handling still vapors and weathering gases in refineries, air compressing, and repressuring oil sands. *Write for Bulletin entitled—*

"THE NEW AND IMPROVED TYPE-80 COOPER-BESSEMER GAS ENGINE COMPRESSOR."

MANY IMPROVEMENTS IN NEW MODEL

INCLUDES LARGE ENGINE FEATURES



THE COOPER-BESSEMER CORPORATION

50-60 B.H.P. ENGINE COMPRESSOR

CONVERTIBLE GAS OR OIL ENGINE

TYPE 16

The first Cooper-Bessemer Type-16 engine compressor units built have been in use over two years. With the exception of a few changes and refinements which were found necessary, these units have been practically free from trouble. Type-16 is small, compact, self-contained—the engine and compressor being built into one direct-drive unit. It is rated at 50-60 B. H. P., depending upon the speed. The unit is shipped completely assembled, and is readily convertible for either gas or diesel operation. Using single or two-stage compressor cylinders, its range is from 26 inches of mercury vacuum suction to 2000 pounds discharge pressure.

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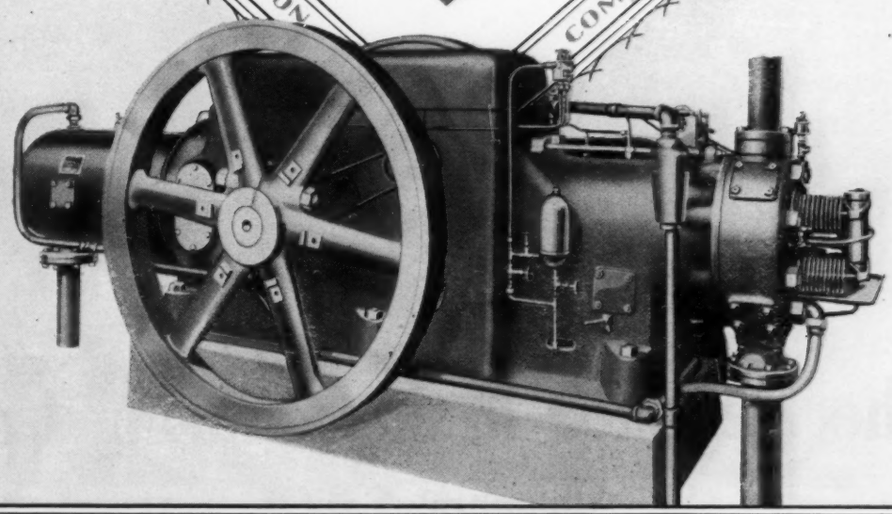
PRACTICALLY TROUBLE-FREE OPERATION

COMPACT BECAUSE DIRECT-CONNECTED



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The Reliance Line now includes a regulator for every purpose in sizes up to six inches, all embodying their patented toggle joint action. Fifteen years experience has proven conclusively that for positive lockup, sensitive and close regulation, great capacity and low cost of upkeep, this device has no equal.

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Welding 14" Naylor Pipe on gas line laid in Texas by The Cabot Company.

Easily Welded — Right In The Field

. . . One of the Advantages of Naylor Pipe

FAST laying comes from quick welding. And the faster the line can be put in, the cheaper the costs.

Naylor Pipe is readily welded—right on the job.

Here are a few of the reasons why:

1. Toncan Iron—of which Naylor Pipe is made—is the finest welding material. (This is the opinion of a leading manufacturer of welding equipment.)
2. Because of its light weight (Naylor Pipe weighs 50% less than standard weight wrought pipe) it cuts and welds easier and quicker.
3. It is perfectly round anywhere in its length.
4. No special equipment is required to weld Naylor Pipe. It can be easily welded on skids. Toncan welding rod can be readily obtained.

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Naylor Pipe will reduce your pipe line costs.

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Naylor Pipe

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Standardized Naylor Pipe is made in sizes 6" to 12" I. D. and 14" to 20" O. D. in any uniform length desired up to 40' 0". Ends made to wrought pipe standards for all types of coupling.

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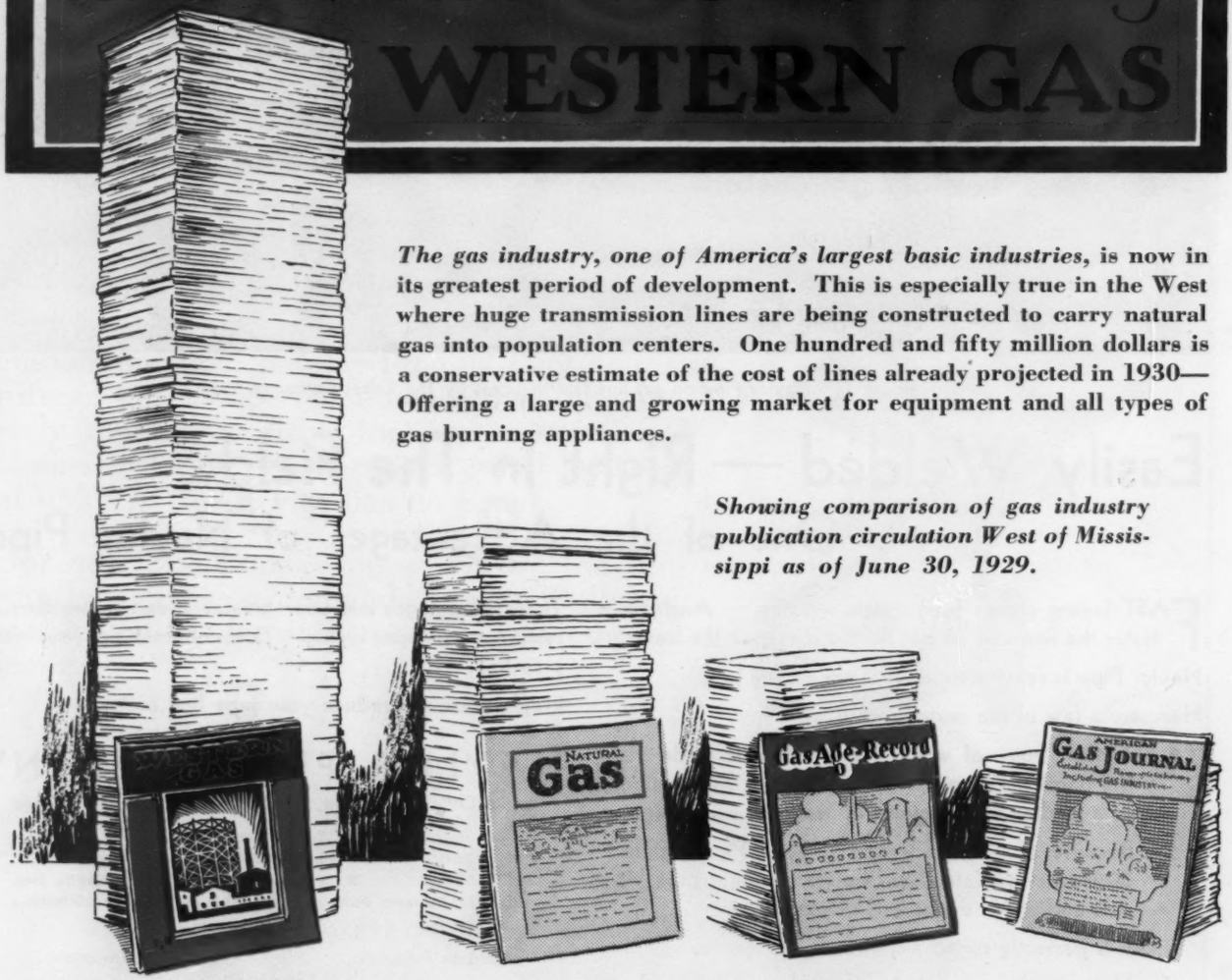
Toncan Copper Molybdenum Iron is a development of Central Alloy Steel Corporation, the world's largest and most highly specialized alloy steel producers. It possesses a superior corrosion resistance, making it the favored pipe material.

THE BIG DEVELOPMENTS ARE IN THE WEST~ *Covered by* WESTERN GAS



The gas industry, one of America's largest basic industries, **is now in its greatest period of development. This is especially true in the West where huge transmission lines are being constructed to carry natural gas into population centers. One hundred and fifty million dollars is a conservative estimate of the cost of lines already projected in 1930—Offering a large and growing market for equipment and all types of gas burning appliances.**

Showing comparison of gas industry publication circulation West of Mississippi as of June 30, 1929.

WESTERN GAS	Natural Gas	Gas Age-Record	American Gas Journal
2201	1015	649	476

More Western Readers Than All Others Combined

REGARDLESS of whether you are selling pipe, gas engines, valves, meters or any type of gas burning appliances you will find WESTERN GAS a real assistance in definitely increasing your sales volume in this section of the industry. WESTERN GAS is read with interest each month by 3,000 western gas men, in all branches of the industry. It not only reaches the heads of the utilities, but department managers, salesmen, engineers, foremen, etc. It will put your sales message over and do it in a dignified and successful manner. The Personnel Directory, which lists the buying personnel of more than 800 gas offices in the 22 Western States, will be available for use by our advertisers in December.

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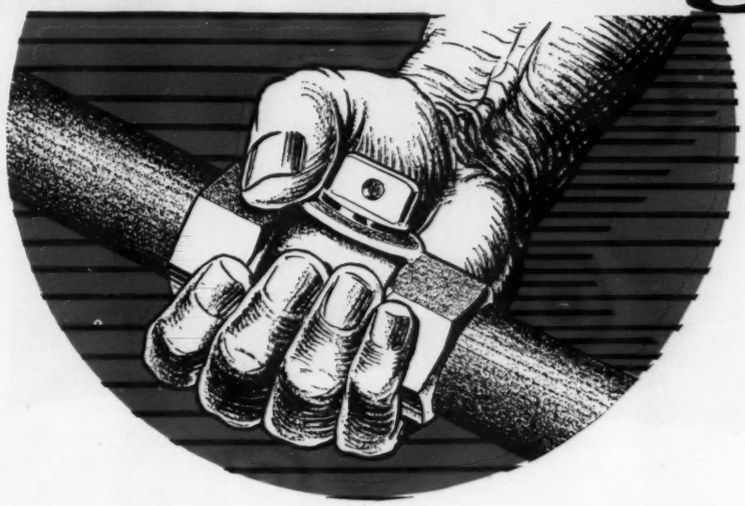
WESTERN GAS

Extra strength



where strain is greatest!!

On gas installation jobs where maximum dependability is essential, it's just common sense to provide additional strength where strain is greatest. That's why you will find Mueller G-11094 gas stops (round way and straightway) used on so many A1 installations. *These* Mueller iron body stops have "recess ends" that extend nearly three-quarters of an inch beyond the threads. Threads are thus protected and *extra* strength is provided where it counts most!

You'll find all characteristic Mueller features in these stops—iron body and red brass key—inlet and outlet threaded at same time, permitting straight line connections—"hot process" galvanizing for underground protection. Made in sizes ¾" to 2" inclusive.

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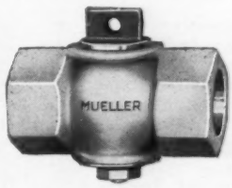
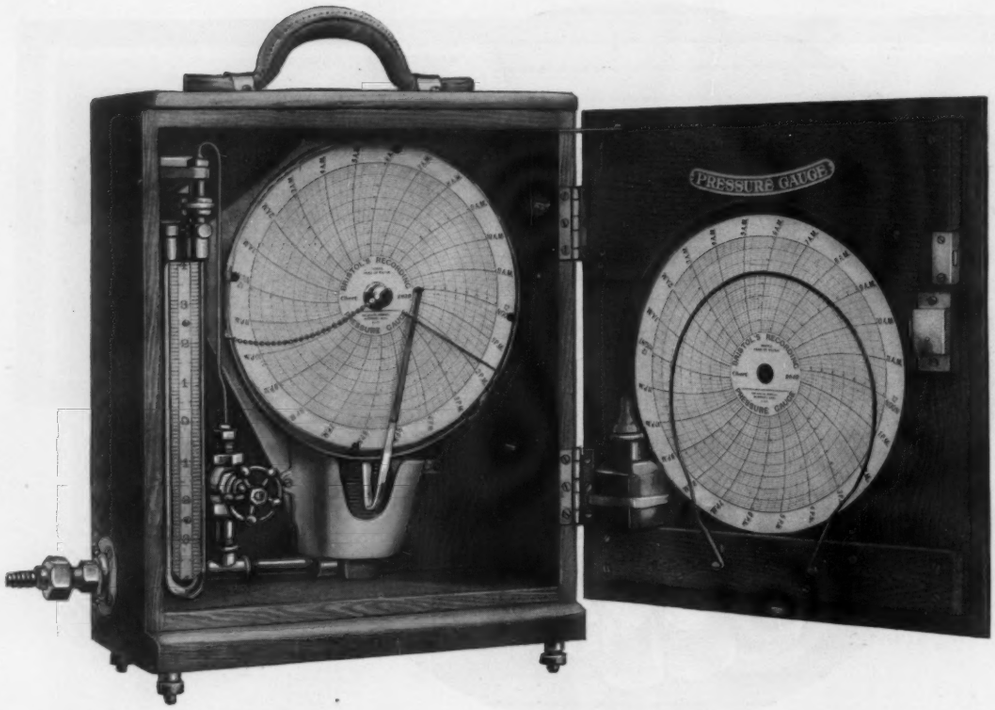


MUELLER
G-11094 Recess End Gas Stop

Mueller gas stops are made in sizes and styles to suit every requirement. Your request will bring complete information or we will gladly make recommendations for specific installation problems.

MUELLER



The Bristol's Portable Type Recording Pressure Gauge shown here consists of a pressure-measuring element, securely mounted inside a wooden protection case. The case is strongly constructed of light weight wood and has leather handle for carrying. Space is provided inside the door for extra charts, ink, etc. Also included is a U-tube to facilitate checking the accuracy of the recorder. Uses 12 or 8-inch charts to provide 24-hours or 7-day records. Inherent ruggedness and accuracy under all conditions makes this an ideal instrument for general test purposes.

When Your Customers Complain of low pressures

The Most Extensive Line of Recording, Indicating and Controlling Equipment for the Industries, including:

Pressure and Vacuum Gauges; Liquid Level Gauges; Electrical Boiler Water Level Gauges; Recording Thermometers; Indicating and Recording Pyrometers; Recording Psychrometers; Recording Electrical Instruments (including Voltmeters, Milli-Voltmeters, Ammeters, Milli-Ammeters, Shunt Ammeters, Wattmeters, Frequency Meters); Mechanical Motion Recorders; Electrical Operation Recorders; Indicating and Recording Tachometers; Engine Counters; Revolution Counters; Averaging Instruments; Gaugeboard Clocks. Also equipment for automatically controlling Temperature, Pressure, Liquid Level, Liquid Flow, etc.; together with Motor Operated and Solenoid Controller Valves, and Control Panels.

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Bristol's Engineering Service is at the disposal of any organization desiring to make a survey of instrument possibilities, or adapting Recorders or Automatic Control Instruments to new developments. There's no obligation entailed.

MANY leading gas companies have found that it pays handsome dividends to answer pressure complaints "with actual FACTS"—rather than vague argument; by so doing they avoid misunderstanding and strained public relations.

These **facts** are obtained with a Bristol's Portable Recording Pressure Gauge, which, when installed in the line at customers' premises, makes a continuous automatic record of pressures delivered at that point over a period of several days or weeks, as desired.

Such records are entirely automatic. They tell a true, unbiased story of exact pressures maintained. A story which is easily explained, and readily understood.

This same type of Gauge can be used to locate other distribution trouble, such as leaks and water in the line.

Write for complete information, prices, etc.

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Volume V **November, 1929** **No. 11**

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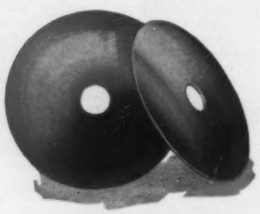

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KLIXON products offer the exclusive advantages of the Spencer Disc Thermostat.

The inherent snap action of the Spencer Disc is responsible for the utter simplicity of these devices and accounts for their consistent performance whether called upon to act at frequent intervals or to lie dormant for years.

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"Reg. U. S. Pat. Off."

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in *Western America*

SAN FRANCISCO LOS ANGELES DALLAS

A Layman Outlines

The Challenge *of the* Future

to the American Gas Industry

By DR. PAUL CADMAN

Lieb-Keystone & Company

A LAYMAN'S viewpoint is often stimulating. Dr. Cadman, who brought this message to the Pacific Coast Gas Association at its 30th Annual Convention held last month at Del Monte, Calif., touches the gas industry through the avenue of financing, but he has a clear perception of the forward direction which the industry must pursue. The need for imagination, says Dr. Cadman, is the biggest present challenge to gas company executives.—EDITOR.

THE public's interest in gas securities is only a phase of a larger problem, namely the public's interest in securities in general. It would certainly be interesting to study the reasons why investors buy securities; interesting not only to the broker and the underwriter, but to the corporation executives who are charged with the duty of financing their enterprise.

Some people buy securities because they think they are going up. Some people sell them without owning them because they think they are going down. Perhaps a negligible group buy and sell without any reason at all. But we are interested in that segment of the investing public who will buy and hold securities. Our approach to the problem must be from your point of view rather than from that of the market in general and this matter is important because your industry cannot expand and develop without the investing public's interest. Corporations of this country today finance their expansion largely through the issuance of bonds and stocks. Although bonds are still in vogue, they are in many instances a cumbersome form of credit, very little adapted to the changing needs of industry. The tendency to resort to common stock as the best means of securing funds is more and more marked and in the going concern, the issuance of rights has been a very attractive device.

It will not be unreasonable to narrow the problem a little and ask: Why does the public buy common stocks of gas companies and why does it exercise the rights which are offered? The answer is not hard to find. First of all, the business must have earnings; perhaps the basic unit of measurement in securities today is their earning power. But also these earnings must be recurrent and there must be a seasonable assurance not only that they will continue, but that they will increase. The next point of attraction will be the possible enhancement in value. This is what the economists call the unearned increment. The term is unsatisfactory for in the majority of cases, the increment is really earned by risk and foresight and patience.

The public is disposed to discount the future, and while a conservative measurement of value would probably be about 15 times the earning power of a security, there are a great many which sell at 20 and even 30 times their earning power. The sole reason why this is possible is the confidence of investors in the future of the industry, as well as in the country at large. After all, you cannot be a "bear" on the United States and if you are going to deal with the American industry, you cannot be a bear on the public utilities. But this confidence will have to be justified by your corporations and this justification will find expression in your ability to decrease your unit cost of production and to increase the market for your commodity.

(Continued on Page 56)

The Rate Complex: *A Playlet*

In Which We Witness the Entrance of Modern Inducement Principles Into the Ancient Science of Gas Rate Making

By A. W. YOUNG

ILLUSTRATED BY STANLEY JOHNSON

THROUGH THE popular medium of stage props and character contrasts the Pacific Coast Gas Association Commercial Rate Committee has added a forceful chapter to the growing philosophy which underlies the rewriting of obsolete rate schedules. "The Rate Complex: A Playlet," represents the contribution of this committee (L. F. Galbraith, Pacific Gas and Electric Company, Chairman) to the recent Del Monte convention of the P.C.G.A.

FOR A FOUNDATION in the whys and wherefores of gas rate-making, read this playlet. The characters of "Robert Hutchins, rate engineer," and "Mortimer Jackson, new business manager," are broadly drawn to epitomize two widely divergent views on the subect of gas rates. And while the action was set in the year 1910 we fear that there are still those within the industry who can profit from reading "Jackson's" lines.

READ THIS PLAYLET for pure enjoyment, but read it too for a moral which is not far to seek.—*Editor.*

CHARACTERS—*(As played before the September 13 general session of the Pacific Coast Gas Association's 36th Annual Convention):*

J. J. York, President of General Gas Company.....Henry Lenninger

Robert Hutchins, Rate Engineer.....A. W. Young

Mortimer Jackson, New Business Manager.....George V. Lacey

Stenographers .....Betty Roberts; Grace Groscup

(Messrs. Lenninger, Young and Lacey—Pacific Gas and Electric Company. Betty Roberts—Tucson Gas, Electric Light & Power Company. Grace Groscup—Pacific Gas and Electric Company.)

Time: 9:00 A. M., October 1, 1910.

[SCENE: *Action transpires at the headquarters of the General Gas Company. A partition divides the stage into two offices, that of the rate engineer and that of the new business manager. As the curtain rises both executives are seen at their desks. Mr. York, president of the General Gas Company, enters the office of the rate engineer, handing Mr. Hutchins a letter.*]

MR. YORK: Read this, Mr. Hutchins. The Directors have had another meeting and this is the result. You remember I told you that the entire meeting last week was devoted to a rate discussion. The Chairman of the Board came out flatly and stated our present rate was obsolete.

MR. HUTCHINS *(Takes letter and glances it over. Frowns thoughtfully, then becomes agitated):* This is surely

a preposterous assumption. The Chairman of our Board is going to ruin us with his mischievous ideas. Listen to the riffraff. *(reads):*

"I have come to firm believe that the future of our Company is, to a great degree, dependent on the form of rate structures it develops to accommodate the several sets of conditions it has found among its consumers."

Will someone please tell me what he is raving about?

MR. YORK: Read the next few lines, Hutchins. He attempts to make it clear.

MR. HUTCHINS *(reads):*

"I believe that the gas business must recognize and adopt class rates. The rates I have in mind must fit the existing and potential uses of gas, so as to encourage a more complete and natural use of our commodity, and to create for it enduring public favor and substantial eminence in the realm of competition. I favor gas rates with definite inducement features, and perfect adjustment between all consumers."

Imagine that from a Director. Is he crazy? Where'd he get such bunk as this? Perfect rot. Maudlin sentimentalism. *(Hutchins lightly drops letter into the waste basket).*

MR. YORK: Well, no matter where he got it, he expresses a sentiment that I have to contend with at every Board meeting. The Directors want a new domestic rate, Hutchins. By some strange coincidence they have singled out the weak place in our business and charged our existing rate form with the responsibility.

Let me have that letter. I want to read you some more. *(takes letter from Hutchins and reads.)* These are his conclusions:

"For a long time our residential consumption per consumer has been dropping off. More and more consumers are using gas intermittantly, or occasionally. The load is not steady. When used as a matter of convenience, the quantity is small. Domestic consumers are doing less cooking at home. This class is our greatest problem. We see them steadily shrinking into minimum bill payers, and unprofitable customers. They no longer pay their way. More than that, they create a loss which is reflected in the rate we have been charging the profitable consumer. This must be remedied at once, or before 1929 the gas business will be fighting with its back to the wall."

MR. HUTCHINS *(incredulously):* The poor nut. Where in thunder did he get those theories? Say, Mr. York, do you suppose he's been talking with Jackson?

MR. YORK: Of course not. The Chairman of the Board doesn't confer with the New Business Manager.

MR. HUTCHINS: Well it surely sounds like some of Jackson's sentimental idealism. I'd never have imagined the Chairman of the Board of the General Gas Company displaying that brand of thwarted mentality.

MR. YORK: Well, let's not hold a pathological autopsy on the old gentleman. Our duty is clear. The Directors wish us to formulate a new and superseding schedule of domestic rates—rates with a fighting edge, if you get the idea.

MR. HUTCHINS *(despairingly)*: I don't get it at all, Mr. York. All that stuff in his letter is a modern travesty on the science of rate making. It lacks precedent and tradition. It's academic and visionary. I've been making rates for this company for 20 years, and the principles haven't changed one bit. Let me elucidate, Mr. York. In the first place rates must be formulated to sell the greatest possible number of units of the commodity behind them, at returns which will yield the greatest possible profit on the investment used and useful in supplying the commodity. In the second place—

MR. YORK: Let's not go into that again, Hutchins. I grant you that the text books and the other authorities, including yourself, are exceedingly profound on the subject, but, darn it all, the Chairman does seem to have added a new chapter to the book. There are certainly uses for gas, beyond the base cooking load, which can be served through practically the same facilities of the company, and which, because of a high diversity, can be furnished at a lower cost and consequently at a lower rate. Am I right?

MR. HUTCHINS: You overlook the fallacy in that line of reasoning.

MR. YORK: What fallacy, Mr. Hutchins?

MR. HUTCHINS *(earnestly)*: To sell gas at a rate based on that assumption, you would have to penalize the small consumer. The same rate structure which induces your theoretical normal consumer to make full use of the commodity, which he is now alleged to be deterred from doing on account of the rate, would actually have to penalize a man for restricting his use of our service. Think of the howl that would go up.

MR. YORK: My conception is that it can be done equitably and without unjust discrimination. If all consumers really understood the underlying principle, we would have as much clamor for the company to maintain its top rate as we now have for reducing the blocks in our schedule. . . . . Well, Hutchins, please get your department on the job at once. I'll reply to the Chairman that we are giving consideration to his request. And by the way, you might talk over the problem with Jackson.

MR. HUTCHINS *(with amazement)*: With Jackson? Who? Him?

MR. YORK: Certainly. What's wrong with it?

MR. HUTCHINS: What in hell does he know about rates?

MR. YORK: Probably nothing. But there is a sales element to the proposition. Jackson can help on that.

(York returns to his desk. Hutchins gazes after him in undisguised astonishment, then stares in the direction of Mr. Jackson's office. Finally he calls his secretary.)

MR. HUTCHINS: Please take a letter. *(dictates).*

Mr. Mortimer Jackson,
New Business Manager,
General Gas Company.

Perhaps you know that the company is contemplating some slight rate adjustments in the domestic schedule. The directors are somewhat concerned over your poor sales showing, and feel that perhaps some impetus can be given to sales by a little stimulant embodied in our rate. What do you say to a cut of 2c per thousand cubic feet all the way down the line? I assume this will meet with your hearty approval, and will likewise give your department another lease on life.

Your reply will be awaited with interest.

Very truly yours,

MR. HUTCHINS: Please write that immediately *(on the side—soliloquizes)* Well, old Jackson has a tough job, and I imagine this will make him feel pretty good. It will tickle him too, being consulted about the rate.

(Letter from Hutchins is delivered to Jackson. Jackson opens and reads it.)

MR. JACKSON: Please take this letter, Miss Smith. *(Dictates).*

Mr. Robert Lee Hutchins,
Rate Engineer,
General Gas Company.

Dear Sir:

I have for acknowledgment your announcement of a 2c drop in all blocks of the domestic schedule. You ask my opinion. Very frankly, such a change will not do a damn bit of good.

Now as to my recommendation—I have just one term for the sort of rate which will increase the sale of gas. I mean inducement principles. I would like to see maximum development fostered in the potential fields of further domestic utilization in which operating cost is a factor in the choice of fuel. In brief, my conception of the rate we want is one which enables every consumer to standardize on complete gas equipment for all of his logical uses within the class where his mode of living locates him.

Yours sincerely,

(Letter to Hutchins).

MR. HUTCHINS *(as he reads the letter)*: Confound that fellow's nerve. Of all the stark, raving lunacy I have ever run into, this is the limit. This man is a mental wreck. Theory, theory, theory! Sentiment! Idealism! Impracticability! What's that bird

know about hourly peaks, seasonal peaks, installed generating capacity, and normal sendout? He'd cause a serious unbalance in our generating capacity.

Miss White, we'll just write that dumb ox. *(Dictates).*

Mortimer Jackson,
New Business Superintendent.

Your latest comment on the pending rate matter at hand. Please favor me with an immediate reply as to whether a flat 3c general cut meets with your approval—

. . . . We'll change that Miss White. If that order-taker thinks I'm a piker, I'll open his eyes. I'll slash the cockeyed minimum, too. Write him as follows.

In keeping with your radical ideas, I am personally willing to cut 15c off our minimum and, May the Good Lord forgive me, knock off 4c on the blocks. Trusting this meets with your approval and that I can make my report to the management tonight, I am

(Jackson receives and reads his letter. He calls Secretary).

MR. JACKSON: A letter to Mr. Hutchins. *(Dictates).*

Robert Lee Hutchins,
Rate Engineer.

I have always believed that the rates for our commodity should compare with the generally accepted costs associated with the function for which it may be substituted.

In the second place, the rate must be susceptible to class division. By this I mean that every purchaser must be able to find some of the commodity at a price he can afford to pay for enough to fill his needs.

Finally the rate must follow the cost involved by a differential which has been worked out in harmony with the elements named above.

Bearing the foregoing in mind, two things would then be accomplished. The first is to equalize the fixed charges incident to our plant and commercial establishments. The second gives a clear cut preference to the all-gas installation.

Therefore, in conclusion, as long as the present form of rate of the company remains virtually the same, I am not willing to subscribe to any cut in the price of gas.

Yours very truly,

(Letter to Hutchins).

MR. HUTCHINS: What, another blast from the boy wonder? *(reads letter).* Why, the colossal dumb-bell. This just goes to show that a little knowledge is dangerous. Not a single thought on how to take care of the loss in present revenue. Not the germ of an idea on how to keep existing consumers from leaving the line under his top rate. Not a damn solitary opinion on how to retain public good will.

Miss White, take a letter to that swine, Jackson.

Mr. Mortimer Jackson,
New Business Manager.

If, as your letter of even date says, you are not willing to subscribe to any cut in the price of gas, then in the name of common sense, what are you driving at?

(On the side to Miss White). How can I write a man that he's a damn fool without hurting his feelings—Oh, well, let's not.

MR. JACKSON: *(After reading letter from Hutchins).* A letter to Mr. Hutchins.

Mr. Robert Lee Hutchins,
Rate Engineer.

My objections to our present rate are as follows:

It is predicated on ordinary domestic cooking and is not calculated to encourage the potential business into which we desire to expand. Consumers who are liberal users, get no inducement, but actually carry the losses of the convenience-user group. I would like to see the burden shifted to where it belongs. It will make for cheaper gas to a large and important group of consumers.

Trusting I have made myself understood, I am

Yours very truly,

(Hutchins gets letter and reads).

MR. HUTCHINS: *(omniously)* Miss White, a letter to Mr. York. *(Dictates).*

Mr. J. J. York,
President and General Manager.

I am handing you herewith the complete file of correspondence between this office and that of the New Business Manager. My resignation will be held up 24 hours, pending your decision.

Yours very respectfully,

(Letter and file delivered to York. In a few seconds York rushes into Jackson's office, file in hand.)

MR. YORK: Mr. Jackson, I have followed with interest the exchange of letters between you and Mr. Hutchins. I am quite concerned with the problem myself. Will you prepare for me a memorandum on how we will cope with the loss in revenue from existing consumers, if we go on the basis you suggest, and, secondly, how to flatten out our peaks.

(York leaves and enters Hutchins' office).

MR. YORK: Mr. Hutchins, I have followed with interest the exchange of pleasantries between you and Mr. Jackson. Naturally, I am keenly desirous of a satisfactory solution. Will you prepare for me a memorandum on whether competition was an issue in building our present rate. Also what figures have you as to the point where metered consumption divides between profitable and non-profitable quantities. *(exits).*

MR. JACKSON *(calls secretary and dictates)*:

Mr. J. J. York,

Answering your questions concerning revenue and peak conditions:

My department will stem any loss in revenue by agressive load building campaigns. Give us the form of rate we seek and we will sell a more extensive use of our service to a bigger proportion of our customers.

We are not afraid of unbalanced peaks because, with a strong aggressive sales program, we will distribute the load more generally throughout the year. The rate will permit of uses for gas not dependent upon past custom or traditions. We will give you a large number of thermostatically controlled heating jobs operating 12 months. You will see a tremendous influx of automatic water heaters, giving continuous service instead of the manually operated tank heaters or tea kettle. We will add the dryer, incinerator and refrigerator to our lines. Manufacturers are making better looking and more efficient appliances—jobs that every family will desire to possess. Appliance sales will soar; kitchen ranges, as beautiful as a fine car; heating equipment for every room, as showy as any piece of furniture in it; water heaters and furnaces that make the basement or service porch as clean and inviting as the engine room of a ship—all of these together with correctly analyzed operating costs as the basis for the rate, will enable us to adequately cope with any production or distribution problem.

I trust this completely answers your questions.

Yours very truly,

(Meanwhile Hutchins has been performing frantic evolutions with his slide rule, jotting down figures, consulting books, etc. Finally gives up in despair, tears up papers, and calls secretary).

MR. HUTCHINS: Miss White, ask Mr. Jackson if he has any figures on relative costs of gas versus competitive fuels.

(Jackson selects papers from his desk, glances through them, clips them together).

MR. JACKSON: Miss White, please take these to Mr. Hutchins, and tell him they are my reports for the years 1900 to 1910. He can keep them. I was just about to destroy them.

(Miss White takes reports and enters Hutchins' office. Hutchins turns to meet her).

MISS WHITE: Mr. Jackson sent these to you, Mr. Hutchins.

MR. HUTCHINS *(growls)*: What are they?

MISS WHITE: I don't know, but he said you could keep them, because he was just about to destroy them.

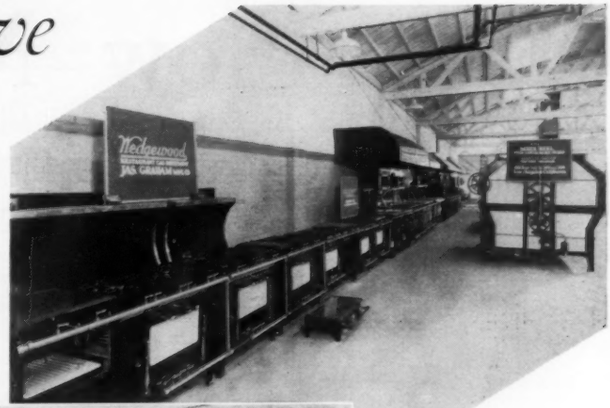
MR. HUTCHINS: *(reaches for the reports—glances through them truculently. Rises in great heat and throws the bunch forcibly into waste basket).* I'll save him the trouble.

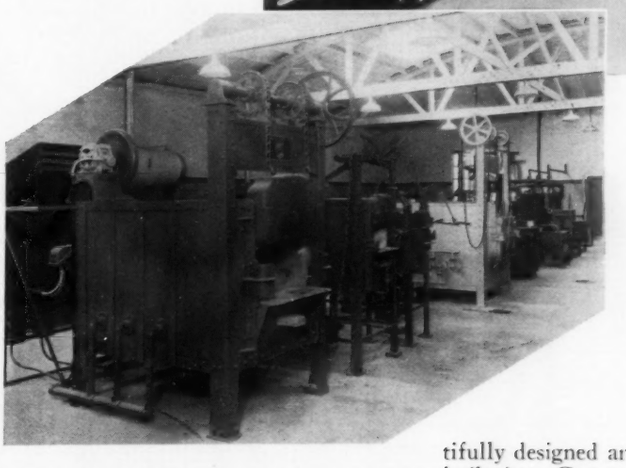
(Hutchins and Jackson, in unison, put on hats, pick up golf bags and prepare to leave their offices. Hutchins eyes reports which he has thrown in the waste basket contemplatively and hesitates).

MR. HUTCHINS: Perhaps I ought to discuss those with Jackson . . . Oh well, what's the use——

(Continued on Page 44)

Creating a Cooperative Industrial Exhibit In Los Angeles





SEEN at the Natural Gas Bureau Industrial Equipment Exhibit in Los Angeles.

ABOVE: Battery of restaurant ranges in foreground — bake oven at right in background.

LEFT: Heat treating furnaces, equipped with automatic heat control.

By J. L. VANCE

Manager of Natural Gas Bureau, Industrial Equipment Exhibit, Los Angeles, California

SOMETHING different in industrial gas sales is about to be launched in Southern California, in the form of a permanent working exhibit of industrial gas equipment—an exhibit housed in a specially prepared structure, maintained by a full-time staff, and representing an auxiliary sales headquarters to the industrial departments of the three gas utilities which are joining in the enterprise.

J. Lyle Vance

The Los Angeles Gas and Electric Corporation, the Southern California Gas Company and the Southern Counties Gas Company, with distribution systems which closely adjoin each other, have recognized the need for a more effective method of encouraging the greater use of gas in Southern California's rapidly growing industrial development and since it was not an economically sound policy for any one of the companies to undertake a broad and comprehensive campaign alone, the three utilities have gradually developed a cooperative plan for strengthening their approach to the industrial gas prospect.

In the past a committee composed of C. M. Grow of the Southern California Gas Company, chairman, Frank Weiss of the Los Angeles Gas and Electric Corporation and Clyde Potter of the Southern Counties Gas Company had handled exhibits in temporary shows, and brought united support to other matters of common interest, but when it was decided to establish the permanent exhibit to promote and encourage the greater use of natural gas, it was recognized that the committee should be enlarged so that the three original members should have assistance in the new venture. A sub-committee was then formed and given immediate charge of establishing the Industrial Gas Equipment Exhibit of the Natural Gas Bureau. Charles L. Ferry of the Southern Counties Gas Company was appointed chairman of the Exhibit Committee, with C. A. Thorp of the Los Angeles Gas and Electric Corporation and E. M. De Remer of the Southern California Gas Company serving with him.

A building at 815 East Washington Street, Los Angeles, was taken on a long term lease, and here the equipment is now being set up. At the present writing, late in October, it appears that the completed exhibit will be open to the public about December 1. This building has a frontage of 50 feet on Washington Street and a depth of 125 feet, with an average width of 55 feet, all of which is ground floor space. The building is admirably adapted for the purpose to which it is being put. It is well lighted by means of 10 large sky-lights, and has a large window which has been converted into a show window. A reception room and private office, beautifully designed and furnished have been built in. Gas, water and electric outlets were installed in all of the display spaces so that all appliances will be shown in full operation rather than merely being set in place without connections. The piping for these connections has been buried in the concrete floor and the outlets brought up beneath or behind all of the various pieces of equipment, so that the distribution system of these connections represents the very best practice in commercial and industrial installation.

The commercial and industrial salesmen of the three gas companies, as well as the sales engineers of the exhibiting manufacturers, will use the display constantly, bringing in their prospects for industrial and commercial gas appliances for practical working demonstrations. The exhibit manager will assist in these demonstrations.

Drop-in prospects will be given every attention; the location of their business will be ascertained and the gas company from whose lines they are being served or from whose lines they can best be served will be notified of the interest the prospect has in the use of gas. The manufacturers whose equipment most nearly meets their needs will also be notified and every means taken to see that a careful follow-up is made by all concerned so that more gas and better equipment may be put to work.

(Continued on Page 60)

Open Flow Measurement *of* Gas Wells

By WALTER REID
Consulting Engineer
Dallas

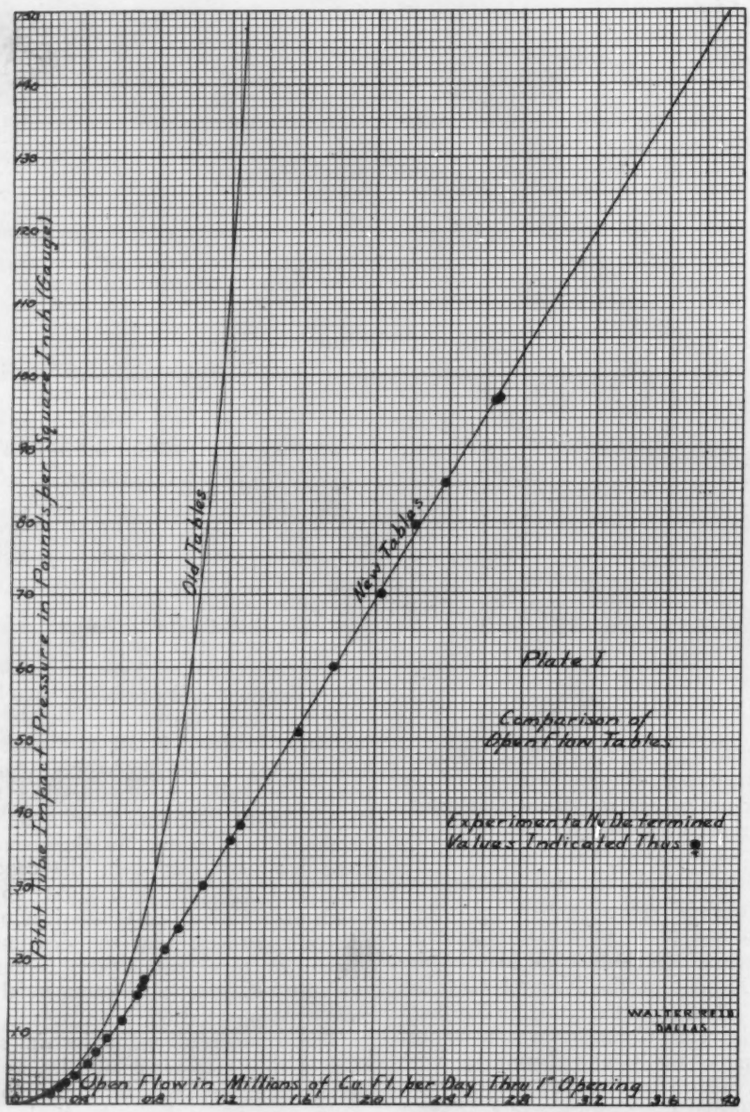

Pitot Tube Impact Pressure in Pounds per Square Inch (Gauge)
Old Tables
New Tables
Plate 1
Comparison of Open Flow Tables
Experimental & Determined Values Indicated Thus
WALTER REID DALLAS
Open Flow in Millions of Cu. Ft. per Day Thru 1" Opening

Plate 1.

DURING the past few years there has been considerable agitation against the practice of making monthly open-flow tests of gas wells and numerous suggestions have been made for determining the capacities of wells without the necessity of removing all the back pressure at the well head. Engineers who have suggested new methods of determining well capacities have been seriously handicapped by the fact that the common Pitot tube tables, which they use as a standard to check the validity of their proposals, contain serious errors. The present paper discusses an investigation into the accuracy of the tables in common use and proposes a new set of tables to supersede them. That the error in the old tables is a serious one is shown by the curves on Plate 1. It is seen that at a pressure of 100 pounds, the new tables give values that are more than twice those given in the old tables.

S. W. Robinson, of Ohio State University, was apparently the first investigator to apply the Pitot tube to the flow of gases. In a paper published in Van Nostrand's Engineering Magazine of August, 1886, and later in Volume 6, 1888, Reports of the Geological Survey of Ohio, he gives a discussion of the theory of the device when applied to gases and presents experimental data to substantiate same.

Robinson stated that the hydraulic formula was satisfactory for measuring low velocity flow of gases where the change in density during flow could be neglected, but that for high velocities where there was a large drop in pressure, the adiabatic formula should be used. He prepared a table showing the delivery in cubic feet per day through various size pipes for impact pressures up to 60 pounds per square inch and this table has been in general use in the gas industry since that time.

ERRORS IN OLD TABLES

When experimenting with the flow of air discharging through orifices into the atmosphere, Robinson found that, at high velocities, the static pressure of the jet exceeded atmospheric pressure, but he stated "in cases where there is no *vena contracta,* as for the mouth of cylindric pipes, there can be no residual static pressure at the plane of the exit mouth." This assumption is not true and is responsible for the principal error in the common open-flow tables. As a matter of fact, the static pressure of a jet discharging from a cylindrical pipe is never less than 50 per cent or 60 per cent of the absolute impact pressure of the jet. Consequently, when the impact pressure is more than 12 or 14 pounds per square inch, the static pressure is more than the atmospheric pressure.

T. R. Weymouth, in a paper entitled "Measurement of Natural Gas" presented before the American Society of Mechanical Engineers in 1912, discussed Robinson's paper and substituted in the adiabatic formula constants which were more applicable to natural gas. The corrected formula as given by Weymouth gives results at 60 pounds impact pressure which were about 1 per cent lower than those given in Professor Robinson's table. In the hand-book of

natural gas by H. P. Westcott, there is a discussion of open-flow measurement by Robinson and a table credited to F. H. Oliphant which was evidently calculated by the adiabatic formula, using slightly different constants from those used by Robinson. This table also occurs in the latest edition of the Natural Gas Handbook by J. C. Diehl.

As stated above, all of these tables are calculated by the adiabatic formula with the assumption that the static pressure of the jet, as it leaves the pipe, is equal to atmospheric pressure.

Plate 2 is a photograph of a large well discharging into the air through 8-inch casing. The velocity of the gas, as it leaves the mouth of the well, is approximately 1,450 feet per second (the velocity of sound in methane); yet, before the gas has moved one diameter above the end of the pipe, it has expanded to about twice its original cross section. A similar phenomenon is always observed when a large well is opened to the air, proving conclusively that the jet has a static pressure considerably more than the atmospheric pressure. For small wells discharging at low velocities, the column moves vertically upward for several diameters without appreciable expansion.

If it is assumed that the maximum velocity of a stream of gas flowing from a circular pipe into the atmosphere is approximately that of sound, it necessarily follows that as the flow increases above a certain critical amount, the density of the gas must also increase.

The writer has determined experimentally that when the velocity of a stream of gas issuing from a cylindrical pipe reaches approximately the velocity

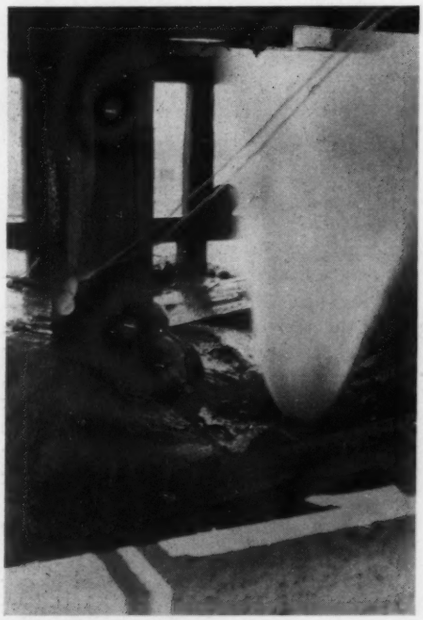


Plate 2.

TABLE NO. 1

FOR DETERMINING OPEN FLOW OF GAS WELLS WITH PITOT TUBE WHEN IMPACT PRESSURE IS LESS THAN 15 LBS

IMPACT PRESSURE			OPEN FLOW IN M CUBIC FEET PER DAY								
Inches of Water	Inches of Mercury	Pounds per Square In.	1"	2"	3"	4"	5"	6"	8"	10"	12"
0.1			10.97	44	99	176	274	395	702	1,100	1,580
0.2			15.52	62	140	248	388	559	994	1,550	2,240
0.3			19.00	76	171	304	475	684	1,220	1,900	2,740
0.4			21.95	88	198	351	549	790	1,410	2,200	3,160
0.5			24.53	98	221	392	613	882	1,570	2,450	3,530
0.6			26.89	108	242	430	672	968	1,720	2,690	3,870
0.7			29.03	116	261	464	726	1,050	1,860	2,900	4,180
0.8			31.02	124	279	497	776	1,120	1,990	3,100	4,470
0.9			32.92	132	296	526	823	1,180	2,110	3,290	4,740
1.0			34.69	139	312	555	867	1,250	2,220	3,470	5,000
1.25			38.78	155	349	620	969	1,400	2,480	3,880	5,580
1.36	0.10		40.45	162	364	648	1,010	1,460	2,590	4,050	5,820
1.6	0.12		43.89	175	395	702	1,100	1,580	2,810	4,390	6,320
1.8	0.13		46.56	186	419	744	1,160	1,680	2,980	4,660	6,700
2.0	0.15		49.00	196	441	784	1,230	1,760	3,140	4,900	7,060
2.2	0.16		51.45	206	463	823	1,290	1,850	3,290	5,150	7,410
2.4	0.18		53.74	214	483	860	1,340	1,930	3,440	5,370	7,740
2.7	0.20		57.20	228	515	915	1,430	2,060	3,660	5,720	8,230
3.0	0.22		60.02	240	540	961	1,500	2,160	3,840	6,000	8,640
3.5	0.26		64.91	260	584	1,040	1,620	2,340	4,160	6,490	9,340
4.1	0.30		70.01	280	630	1,120	1,750	2,520	4,480	7,000	10,100
4.5	0.33		73.60	295	662	1,180	1,840	2,650	4,710	7,360	10,600
5.0	0.37		77.57	310	698	1,240	1,940	2,790	4,960	7,760	11,200
5.4	0.40		80.90	324	728	1,300	2,020	2,910	5,180	8,090	11,700
6.0	0.44		84.91	340	764	1,360	2,120	3,060	5,430	8,490	12,200
6.8	0.50		90.48	362	814	1,450	2,260	3,260	5,790	9,050	13,000
8.2	0.60		99.20	396	892	1,590	2,480	3,570	6,350	9,920	14,300
9.0	0.66		104.0	416	936	1,670	2,600	3,750	6,660	10,400	15,000
9.5	0.70		107.0	428	962	1,710	2,680	3,850	6,850	10,700	15,400
10.0	0.74		109.7	439	987	1,760	2,740	3,950	7,020	11,000	15,800
10.9	0.80		114.5	458	1,030	1,830	2,860	4,120	7,330	11,500	16,500
12.0	0.88		120.1	481	1,080	1,920	3,000	4,330	7,690	12,000	17,300
12.2	0.90		121.4	486	1,090	1,940	3,040	4,370	7,770	12,100	17,500
13.9	1.02	.5	129.2	517	1,160	2,070	3,230	4,650	8,270	12,900	18,600
15.0	1.1		134.2	537	1,210	2,150	3,360	4,830	8,590	13,400	19,300
16.3	1.2		140.1	560	1,260	2,240	3,500	5,040	8,960	14,000	20,200
17.7	1.3		145.8	584	1,310	2,330	3,650	5,250	9,330	14,600	21,000
19.0	1.4		151.4	606	1,360	2,420	3,790	5,450	9,680	15,100	21,900
20.4	1.5		156.7	627	1,410	2,510	3,920	5,640	10,000	15,700	22,600
21.8	1.6		161.8	648	1,460	2,590	4,050	5,820	10,400	16,200	23,300
24.5	1.8		171.7	686	1,550	2,750	4,290	6,180	11,100	17,200	24,700
27.2	2.0	1.0	180.9	734	1,630	2,890	4,520	6,510	11,600	18,100	26,000
29.9	2.2		189.7	768	1,710	3,040	4,740	6,830	12,100	19,000	27,300
32.6	2.4		198.0	802	1,780	3,170	4,950	7,130	12,700	19,800	28,500
	2.6		206.1	824	1,860	3,300	5,150	7,420	13,200	20,600	29,700
	2.8		214.0	857	1,930	3,420	5,350	7,700	13,700	21,400	30,800
	3.0	1.5	221.6	887	2,000	3,550	5,540	7,980	14,200	22,200	31,900
	3.2		228.9	917	2,060	3,660	5,720	8,240	14,600	22,900	32,900
	3.4		235.8	943	2,120	3,770	5,900	8,480	15,100	23,600	34,000
	3.6		242.8	971	2,180	3,880	6,070	8,740	15,500	24,300	35,000
	3.8		249.4	998	2,240	3,990	6,230	8,980	16,000	24,900	35,900
	4.0	2.0	255.9	1,020	2,300	4,090	6,400	9,210	16,400	25,600	36,800
	4.2		262.0	1,050	2,360	4,190	6,550	9,430	16,800	26,200	37,700
	4.4		268.4	1,070	2,410	4,290	6,710	9,650	17,200	26,800	38,600
	4.6		274.5	1,100	2,470	4,390	6,860	9,880	17,600	27,500	39,500
	4.8		280.3	1,120	2,520	4,490	7,010	10,100	18,000	28,000	40,400
	5.0	2.5	286.1	1,140	2,570	4,580	7,150	10,300	18,300	28,600	41,200
	5.2		291.8	1,170	2,630	4,670	7,300	10,500	18,700	29,200	42,000
	5.4		297.4	1,190	2,680	4,760	7,440	10,700	19,000	29,700	42,800
	5.6		302.7	1,210	2,720	4,840	7,560	10,900	19,400	30,300	43,600
	5.8		308.1	1,230	2,770	4,920	7,700	11,100	19,700	30,800	44,300
	6.0	3.0	313.4	1,250	2,820	5,010	7,830	11,300	20,000	31,300	45,100
	6.5		326.0	1,300	2,930	5,220	8,150	11,700	20,900	32,600	47,000
	7.0	3.5	338.6	1,350	3,050	5,420	8,460	12,200	21,700	33,900	48,800
	7.5		350.0	1,400	3,150	5,600	8,760	12,600	22,400	35,000	50,400
	8.0	4.0	361.5	1,450	3,250	5,780	9,040	13,000	23,100	36,200	52,100
	8.5		373.9	1,500	3,370	5,980	9,340	13,400	23,900	37,400	53,700
	9.0	4.5	383.9	1,540	3,460	6,140	9,600	13,800	24,600	38,400	55,300
	9.5		394.2	1,580	3,550	6,310	9,860	14,200	25,200	39,400	56,800
	10.0		404.6	1,620	3,640	6,470	10,100	14,600	25,900	40,500	58,200
	10.2	5.0	408.1	1,630	3,680	6,540	10,200	14,700	26,100	40,800	58,800
	11.2	5.5	428.0	1,710	3,850	6,850	10,700	15,400	27,400	42,800	61,600
	12.2	6.0	447.0	1,790	4,030	7,150	11,200	16,100	28,600	44,700	64,400
	13.2	6.5	465.5	1,860	4,190	7,450	11,600	16,800	29,800	46,600	67,000
	14.3	7.0	483.0	1,930	4,350	7,730	12,100	17,400	30,900	48,300	69,600
	15.3	7.5	500.0	2,000	4,500	8,000	12,500	18,000	32,000	50,000	72,000
	16.3	8.0	516.0	2,060	4,650	8,260	12,900	18,600	33,000	51,600	74,300
	17.3	8.5	532.1	2,130	4,790	8,520	13,300	19,200	34,100	53,200	76,600
	18.3	9.0	548.0	2,190	4,930	8,770	13,700	19,700	35,100	54,800	78,900
	19.3	9.5	563.0	2,250	5,070	9,000	14,100	20,300	36,000	56,300	81,100
	20.4	10.	577.6	2,310	5,200	9,240	14,400	20,800	37,000	57,800	83,200
	22.4	11.	605.6	2,420	5,450	9,680	15,100	21,800	38,800	60,600	87,200
	24.4	12.	632.5	2,530	5,700	10,100	15,800	22,800	40,500	63,300	91,200
	26.5	13.	658.0	2,630	5,920	10,500	16,500	23,700	42,100	65,800	94,800
	28.5	14.	683.8	2,740	6,150	10,900	17,100	24,600	43,800	68,400	98,600
	30.5	15.	707.0	2,830	6,300	11,200	17,500	25,200	44,800	70,700	101,000

of sound in the gas, the absolute static pressure of the jet is a fixed percentage of the absolute impact pressure and the flow varies directly as the absolute impact pressure.

RECENT EXPERIMENTAL WORK

The writer conducted a series of experiments to determine the characteristics of gas streams flowing at high velocities. The primary object of these tests was to determine the relation between the static pressure of the jet and the impact pressure, so that more accurate open-flow tables could be prepared. Another object was to determine whether the static pressure that existed in the pipe a short distance from the outlet could be used to obtain direct open-flow measurements of large wells without the use of the Pitot tube.

It was decided that for the experimental work, a large supply of gas of uniform composition and under high pressure would be necessary. Through the courtesy of the officials of the Hous-

ton Gulf Gas Company, some large wells in the Refugio gas field on the Texas Gulf Coast were made available for experimental purposes. The gas from the wells was practically pure methane and was, therefore, ideal for the purpose of the tests.

The well used for the experiments had a "shut in" pressure of approximately 1,500 pounds per square inch. The gas from the well passed through a "choke rack" installation, thence through a manifold orifice meter installation. After having been measured, the gas was passed through one of the flow lines, from which it discharged into the atmosphere.

FLOW LINES

The flow lines consisted of 2-, 3-, 4- and 6-inch pipes. They were made geometrically similar with regard to length, location of straightening vanes, thermometer and pressure connections.

During each test the Pitot tube or tubes were clamped rigidly in position. The tubes used for the majority of the tests were made of ⅛-inch I. D. pipe but for traverse tests where it was necessary to use two tubes at the same time the tubes were constructed of ⅛-inch O. D. seamless steel tubing. Flexible hose connections ran from the Pitot tubes and static connections to a gauge board and were connected with suitable water columns, mercury columns, or test gauges.

The rate of gas flow was varied by choke nipples and gate valves from minimum readings of the Pitot tube of approximately 9 inches of water to maximum readings of approximately 100 pounds per square inch.

RESULTS OF TESTS

One of the most interesting developments was the fact that the adiabatic formula does not give correct results even for flows below the critical velocity. This fact was demonstrated as follows. An impact traverse was made at the discharge of each flow line at both low velocity and high velocity. It was found that the mean velocity of the stream at both low and high velocity was approximately 86 per cent of the center velocity. When the theoretical rate of flow based on center impact pressure was calculated from the adiabatic formula, it was found that the "efficiency" varied from 84 per cent to 98 per cent, the higher efficiencies being obtained as the velocity reached the critical. When the theoretical rate of flow was calculated by the hydraulic formula, the "efficiency" remained nearly constant at 86 per cent for all velocities up to the critical. This latter efficiency checked the results of the velocity traverse, thus demonstrating the accuracy of the hydraulic formula.

It was found that the maximum or "critical" velocity was reached when the absolute impact pressure at the center was approximately 1.8 times the atmospheric pressure or when the Pitot tube reading was about 12 pounds gauge. After the critical velocity is reached, the flow varies directly as the absolute impact pressure and the formula expressing this fact is known as the "critical velocity formula". The hydraulic formula and the "critical velocity formula" both give practically identical results for several pounds higher than the critical pressure.

When the critical velocity was reached, it was found that the absolute static pressure on the pipes at four diameters from the outlet was 58 per cent of the absolute center impact pressure and consequently the flow varied directly as the absolute static pressure. The formula expressing this fact is known as the "side static formula".

EQUATIONS

The above described formulas are listed below. They are calculated on the basis of .60 gravity, 60 degrees Fahrenheit temperature and 14.7 pounds absolute pressure. They are based on the Pitot tube reading at the center of the pipe, the coefficient or "efficiency factor" of 86.2 per cent being used. "W" denotes inches of water, "M" inches of mercury, and "P" pounds per square inch. "Q" is the rate of flow in M cubic feet per day and "d" is the diameter in inches.

Hydraulic Formula: To be used when the impact pressure is less than 15 pounds gauge.

$$Q = 34.69\ d^2\ \sqrt{W} \qquad (1)$$

$$Q = 128.0\ d^2\ \sqrt{M} \qquad (1a)$$

$$Q = 182.6\ d^2\ \sqrt{P} \qquad (1b)$$

Critical Velocity Formula: To be used when the impact pressure exceeds 15 pounds gauge.

$$Q = 23.81\ d^2\ (P+14.7) \qquad (2)$$

Side Static Formula: May be used when the side static pressure exceeds 3 pounds gauge.

$$Q = 20.12\ d^2\ (M+30) \qquad (3)$$

$$Q = 41.05\ d^2\ (P+14.7) \qquad (3a)$$

Open Flow Tables: The accompanying open flow tables are calculated from the above formulas. It is recommended that the tables be used as given without correction for specific gravity, temperature or pressure base. Do not interpolate between pressure readings but use the nearest value found in the tables. If the correct diameter is not found in the tables, multiply the value for 1-inch opening by the square of the actual diameter.

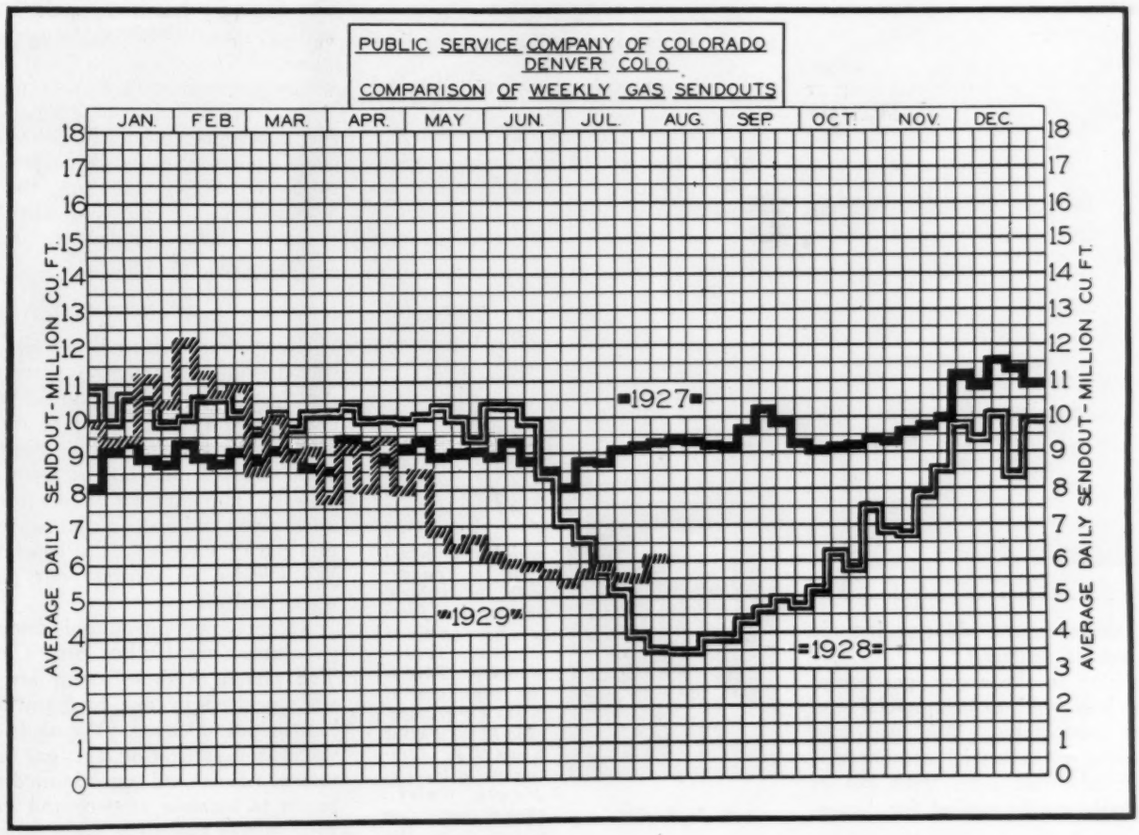
Instructions for Taking Open Flow: Pitot tube should be made of ⅛-inch I. D. pipe. The test nipple should be

(Continued on Page 43)

TABLE NO. 2

FOR DETERMINING OPEN FLOW OF GAS WELLS WITH PITOT TUBE WHEN IMPACT PRESSURE EXCEEDS 15 LBS.

IMPACT PRESSURE Pounds per Sq. In.	OPEN FLOW IN M CUBIC FEET PER DAY								
	1"	2"	3"	4"	5"	6"	8"	10"	12"
15	707	2,830	6,360	11,300	17,700	25,500	45,200	70,700	102,000
16	731	2,930	6,580	11,700	18,300	26,300	46,800	73,100	105,000
17	755	3,020	6,800	12,100	18,900	27,200	48,300	75,500	109,000
18	779	3,120	7,010	12,500	19,500	28,000	49,900	77,900	112,000
19	802	3,210	7,220	12,800	20,100	28,900	51,300	80,200	115,000
20	826	3,310	7,440	13,200	20,700	29,700	52,900	82,600	119,000
21	850	3,400	7,650	13,600	21,300	30,600	54,400	85,000	122,000
22	874	3,500	7,870	14,000	21,900	31,500	55,900	87,400	126,000
23	898	3,590	8,080	14,400	22,500	32,300	57,500	89,800	129,000
24	922	3,690	8,300	14,800	23,100	33,200	59,000	92,200	133,000
25	946	3,780	8,520	15,100	23,700	34,100	60,500	94,600	136,000
26	969	3,880	8,720	15,500	24,200	34,900	62,000	96,900	140,000
27	993	3,970	8,940	15,900	24,800	35,700	63,500	99,300	143,000
28	1,017	4,070	9,150	16,300	25,400	36,600	65,100	102,000	146,000
29	1,040	4,160	9,360	16,600	26,200	37,400	66,600	104,000	150,000
30	1,064	4,260	9,580	17,000	26,600	38,300	68,100	106,000	153,000
32	1,112	4,450	10,000	17,800	27,800	40,100	71,200	111,000	160,000
34	1,159	4,640	10,400	18,600	29,000	41,700	74,200	116,000	167,000
36	1,207	4,830	10,900	19,300	30,200	43,500	77,300	121,000	174,000
38	1,255	5,020	11,300	20,100	31,400	45,200	80,300	126,000	181,000
40	1,302	5,210	11,700	20,800	32,600	46,900	83,400	130,000	188,000
45	1,421	5,690	12,800	22,800	35,500	51,200	91,000	142,000	205,000
50	1,540	6,160	13,900	24,700	38,500	55,400	98,600	154,000	222,000
55	1,660	6,640	15,000	26,600	41,500	59,800	106,000	166,000	239,000
60	1,778	7,120	16,000	28,500	44,500	64,000	114,000	178,000	256,000
65	1,898	7,600	17,100	30,400	47,500	68,400	122,000	190,000	273,000
70	2,017	8,060	18,200	32,300	50,400	72,600	129,000	202,000	290,000
75	2,136	8,840	19,200	34,200	53,400	76,900	137,000	214,000	308,000
80	2,252	9,010	20,300	36,000	56,400	81,100	144,000	225,000	324,000
90	2,492	9,980	22,400	39,900	62,400	89,800	160,000	249,000	359,000
100	2,732	10,900	24,600	43,700	68,400	98,400	175,000	273,000	394,000
110	2,970	11,900	26,700	47,500	74,200	107,000	190,000	297,000	428,000
120	3,208	12,800	28,900	51,300	80,200	116,000	205,000	321,000	462,000
130	3,445	13,800	31,000	55,100	86,200	124,000	221,000	345,000	496,000
140	3,681	14,700	33,100	58,900	92,000	133,000	236,000	368,000	530,000
150	3,921	15,700	35,300	62,800	98,000	141,000	251,000	392,000	565,000
160	4,160	16,700	37,500	66,600	104,000	150,000	266,000	416,000	599,000
170	4,399	17,600	39,600	70,400	110,000	158,000	282,000	440,000	634,000
180	4,635	18,600	41,700	74,200	116,000	167,000	297,000	464,000	668,000
190	4,870	19,500	43,900	78,000	122,000	175,000	312,000	487,000	702,000
200	5,108	20,500	46,000	81,800	128,000	185,000	327,000	511,000	736,000


PUBLIC SERVICE COMPANY OF COLORADO
DENVER COLO.
COMPARISON OF WEEKLY GAS SENDOUTS
JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC.
AVERAGE DAILY SENDOUT-MILLION CU.FT.
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
=1927=
=1929=
=1928=

Denver's First Year of *Natural*

By F. T. PARKS

Manager Natural Gas Department
Public Service Company of Colorado
Denver, Colorado

WITH gas lines completed, gas lines under construction and gas lines being proposed all over the United States, it might be interesting to review the first year's experience of Denver with natural gas.

Some of this experience is no doubt already known—how Denver got ready for natural gas, how 73,000 customers were "changed-over" by districts in 30 days, how the natural gas was piped in 340 miles, from Texas, in record time, how the "change-over" was made in Denver without a single accident, with the exception of burning the handle off a coffee pot, how the advertising helped the customers to cooperate with the company during the "change-over," and what a wonderful gas field we have which is reserved for Denver, making the supply of natural gas dependable for many years to come. And, now, it may be interesting to know the results of the first year's operation with natural gas.

We realized from the start that our big job in Denver was salesmanship; that in order to be successful with the natural gas it would be necessary for us to sell a large volume of the new fuel. Denver is not an industrial town, so we must depend on the domestic customers for our principal source of revenue. We must develop the water heating and househeating load—the cooking load had already been developed on manufactured gas. We further realized that we must also get after all of the commercial and industrial load in sight.

The results of the first year's activity of our New Business Department can best be shown by the accompanying curve, which outlines our daily sendout before and after natural gas was used in Denver.

You will note that our daily sales were averaging about 10,500,000 cubic feet before turning in natural gas, and when natural gas was turned into the entire city and all burners were adjusted to the use of natural gas, our daily sales dropped to 3,500,000 cubic feet per day. This decrease in sales was indirectly proportionate to the increased B.t.u.'s of the natural gas. Our natural gas in Denver has a B.t.u. content of a little over 1,000 (standard conditions) as compared to the manufactured gas formerly sold of 400 B.t.u. (standard conditions).

The most important activity of our New Business Department in building up volume of gas sales in Denver was the househeating program. Househeating with natural gas must be *sold* in Denver. Our customers do not come in and demand natural gas for househeating; and, therefore, it is necessary for our representatives to get out and sell natural gas for househeating on its merits.

Our Denver natural gas rate for Domestic, Househeating and Commercial use is as follows:

First 400 cu. ft. or less	$0.90
Next 600 cu. ft., per 100 cu. ft.	.15
Next 1,000 cu. ft., per 100 cu. ft.	.12
Next 1,000 cu. ft., per 100 cu. ft.	.075
Next 7,000 cu. ft., per 100 cu. ft.	.06
Over 10,000 cu. ft., per 100 cu. ft.	.05

This makes a rate of about $1.50 per M.c.f. for domestic use only, and an average rate of about 64c per M.c.f. for customers who use gas for househeating. This makes the total average bill for househeating customers about $180.00. When this cost is compared with local coal at a price as low as $5.50 per ton, you will agree that we must *sell* gas for housekeeping in Denver.

The results of our first year's New Business merchandise sales are briefly as follows:

Number of gas ranges sold	1,450
Number of water heaters sold	2,155
Number of gas househeating jobs sold	3,500
Room heaters	1,000

(The above figures do not include sales of outside dealers.)

In addition to the above, gas equipment has been sold to commercial and industrial customers. We are now serving about 40 industrial customers at a special industrial rate, with cut-off clause, should gas be needed for domestic use.

The special industrial rate referred to is as follows:

First 100,000 cu. ft. used per month,
Same as Domestic Schedule.
Next 400,000 cu. ft. per month,
25c per M cu. ft.
Next 500,000 cu. ft. used per month,
20c per M cu. ft.
Next 1,000,000 cu. ft. used per month,
18c per M cu. ft.
Next 1,000,000 cu. ft. used per month,
16c per M cu. ft.
Additional cubic feet used per month.
15c per M cu. ft.

Slack coal is very cheap in Denver. We could not replace this cheap coal with gas in large boilers, so we went after the industrials using oil or the better grade of coal. Some of our large customers are as follows:

The Denver Sewer Pipe & Clay Company.

The Denver Fire Brick Company.

The Gardner - Denver Company (Rock Drills).

The Northwestern Terra Cotta Company.

American Manganese Steel Company.

Beatrice Creamery Company.

The commercial customers had been well sold on manufactured gas. Their loads have been further developed with natural gas. Practically all of the bakeries are using gas. The hotels and restaurants are almost 100 per cent equipped with gas. The small commercial customers in the downtown sections use gas for heating purposes.

SALES, REVENUE AND EXPENSES

This is not the place for detailed statistics in connection with our first year's activity with natural gas. Suffice it to say that we have managed to pay all the operating expenses from the beginning of natural gas, and we expect to pay a fair return on our investment as soon as we get our program further developed.

Our town border rate is 40c per M.c.f. for all domestic gas. We receive 15 per cent of revenue derived from sale of gas to industrial customers on special industrial "cut-off" rate.

F. T. Parks

ANY manufactured gas utility which determines upon a change-over to natural gas service, faces a job primarily of intensive salesmanship. This is the substance of F. T. Parks' message to the Pacific Coast Gas Association, at the Del Monte, Calif., annual convention of that body. His observations come from the experience of the Public Service Company of Colorado, where average daily gas send-out plunged from 10,500,000 cubic feet to a low of 3,500,000 when high heat content natural gas replaced manufactured.

The following table shows a comparison, on a percentage basis, of sales, revenue and expenses of natural gas and manufactured gas:

	1927 Mfg. Gas Basis	Year Ending Aug. 1, 1929 Natural Gas
Gross Earnings	100%	102%
Operation and Maintenance	100%	107%
Net Earnings	100%	93%
Total Sales M. C. F.	100%	84%
Total Sales B.t.u.	100%	220%
Domestic Sales M.C.F.	100%	48%
Commercial Sales M.C.F.	100%	57%
Househeating Sales M.C.F.	100%	350%
Industrial—Special	None	248,318 M.C.F.

You will note that on the natural gas basis, gross earnings show a slight increase; also, operation and maintenance have slightly increased. Net earnings have not quite reached the manufactured gas basis. Total sales in M.c.f. were 84 per cent; however, our total sales, on a B.t.u. basis, were 220 per cent. Domestic sales, M.c.f., were about one-half of what they formerly were; while commercial sales showed up a little better than domestic, amounting to 57 per cent. The big gain has been made in househeating, which shows a 350 per cent increase.

The domestic sales have been affected by our househeating program. Whenever a customer is sold househeating, his classification is changed from domestic to househeating; therefore, the househeating program automatically reduces the total number of domestic customers and domestic revenue.

LOST AND UNACCOUNTED-FOR GAS

Every manufactured gas plant that considers the introduction of natural gas anticipates an increase in lost and unaccounted-for gas. This is caused in most cases by cast iron joints being dried out with natural gas, causing them to leak. Having a lot of cast iron mains in Denver, with lead joints, we gave this matter a great deal of consideration. We decided to saturate our gas with water and oil.

Recently we introduced dry natural gas into Fort Collins and Cheyenne. The plants in these towns are owned and operated by our company and are located near Denver. We made no provision for saturating the gas in these towns. Lost and unaccounted-for gas began to increase at once and in Cheyenne, where the mains were largely cast iron, with lead joints, the loss on a 3-inch equivalent basis went from 250 M.c.f. per year to 1,920 M.c.f. per year in less than a year's time. We then leak-clamped all of the cast iron joints and the loss immediately came down. In Fort Collins, where the mains were all steel, the loss went from 150 M.c.f. per mile of 3-inch to nearly 1,000 M.c.f., which we have since reduced by leakage survey work. In both cities we found it necessary to change all meter diaphragms within two years.

In Denver, we profited by our experience in the other towns and from the start saturated the gas with both water and oil vapors. After a great deal of experimental work, we finally adopted the use of steam. The oil and water vapors are introduced at the outlet of each district regulator station. A temperature regulator is used and sufficient steam is introduced to increase the temperature of the gas at the outlet of the saturator two degrees above that at the inlet of the regulator. We have found by test that this keeps the gas saturated to around 90 per cent in the extremities of the distribution system.

The oil is introduced by means of an oil burner spray, using dry natural gas at 5 lbs. pressure as the injecting medium. Ordinary gas oil of 34°-36° Baumé is used, and a little less than one

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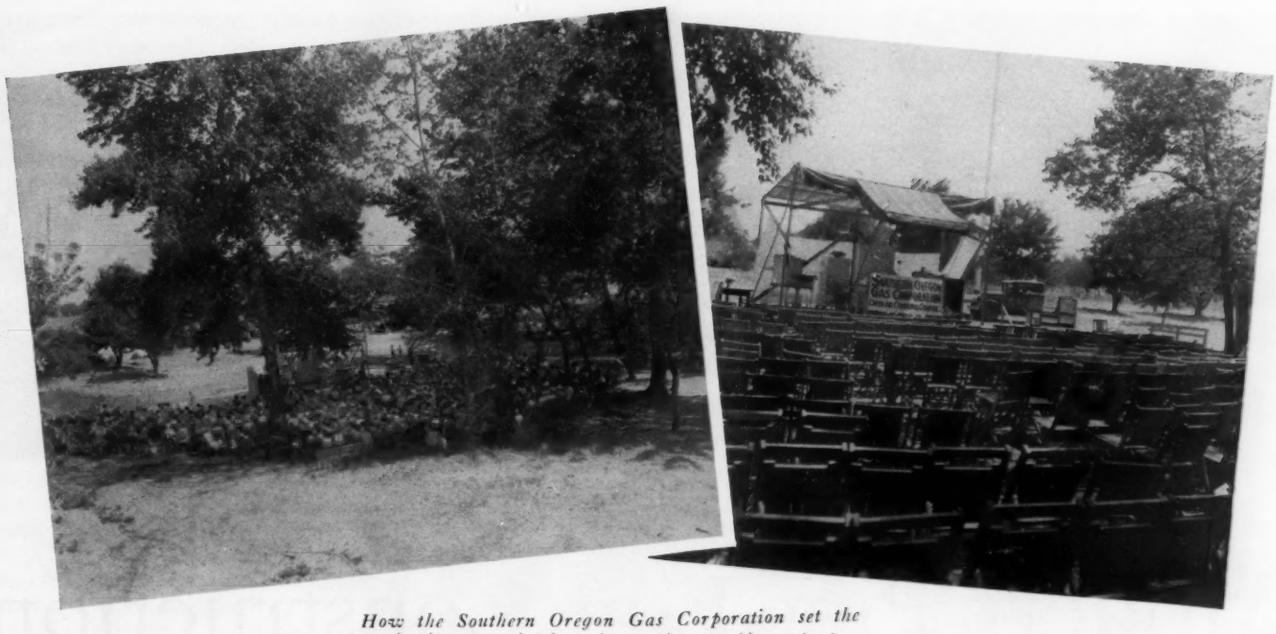


How the Southern Oregon Gas Corporation set the stage for its successful four-day outdoor cooking school.

An *Outdoor* Cooking School

By K. I. DAZEY

General Manager, Southern Oregon Gas Corporation, Medford, Oregon.

SINCE the staging of its open air cooking school last August the Southern Oregon Gas Corporation has received credit for developing something original in gas cooking demonstrations.

The demands of necessity, however, are often the occasion of new ideas, which in many instances would appear to bear the stamp of originality, and so it was with the open air cooking cshool conducted in Medford, Oregon, last August by Miss Victoria Warner of the Tappan Stove Company's Home Economics Department, under the auspices of the Medford Mail Tribune and the Southern Oregon Gas Corporation.

The necessity in this case arose from the very climatic condition which made the plan both possible and successful. Usually during the month of August the residents of Medford can count upon some rather warm weather; so warm in fact that the very thought of having several hundred women sandwiched into available hall space immediately rejected itself. (Parenthetically, let me interpolate the remark that Medford nights are always cool and comfortable, but that there are times when old Sol shines down aplenty during the afternoon hours.)

Therefore, it became apparent soon that a radical departure from established custom was necessary. A change of dates was not feasible, as the services of Miss Warner could be had only during the week of August 12th. Each hall of sufficient seating capacity was carefully considered, and as carefully rejected. There was nothing left but the great out-doors, and even here the solution to the problem was not readily apparent. Finally an appeal was made to the Park Committee of the City Council for the temporary use of a portion of the children's playground, which seemed to offer the greatest advantages, the request fortunately receiving favorable consideration.

The playground is located on the banks of a small stream which winds its way almost through the heart of the city; it abounds in shade trees, and a careful preliminary study of the sun's probable position in mid-August afternoons to come, promised ample shade for several hundred anticipated guests.

Many other questions then advanced themselves, or were advanced by those who doubted the wisdom of the plan; probable wind or rain storms, the noise of children playing nearby, the din of traffic on an adjacent artery, etc. Each one of these objections was given due weight and discarded in the face of contrary evidence as to August weather conditions for many previous years, and a close observance of the acoustic properties of the shady nook in which the school was to be held.

To stimulate attendance, a grand prize of a $150 Tappan range was offered, and substantial daily prizes as follows:

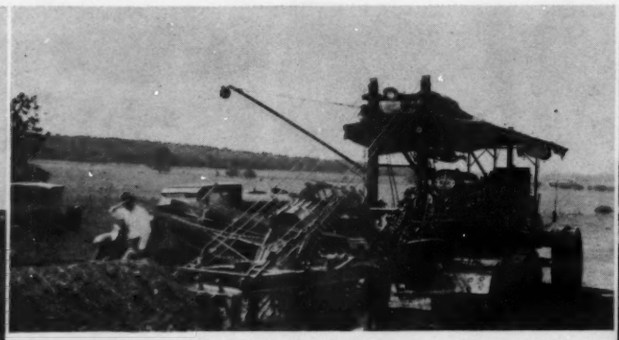
1—$20 Humphrey Radiantfire heater
1—$10 Merchandise order (Redeemable at any store in Medford)
1—$20 Merchandise order to apply on the purchase of a Tappan range.
1—$10 Merchandise order to apply on purchase of a Tappan range.

In addition to the above prizes, local merchants assisted heartily by donating many food prizes as well as by co-operating in the general advertising of the cooking school.

The cooking course was also advertised by distribution of hand-bills and by frequent radio announcements over our local broadcasting station.

Opportunities for worthwhile publicity in connection with the school were not overlooked. In addition to a number of "stills," a reel of motion pictures was taken, showing general views of the assemblage; scenes on the playground adjoining the school, with children at play, in care of attendants; free parking facilities for automobiles; Boy Scouts directing auto traffic, parking, and ushering; views of modern cookery demonstrations; "behind the scenes" shots.

(Continued on Page 43)



LEFT: Fig. 1. Gin truck used for unloading pipe from cars. CENTER: Fig. 2. Wheel type ditching machine. RIGHT: Fig. 3. Pull stroke ditcher used for trenching in rock.

Modern Pipe Line Construction

By ELMER F. SCHMIDT

Lone Star Gas Company
*Dallas, Texas**

A NEW standard of pipe line construction has come about during the past few years. Pipe line projects are now possible that only a few years ago could not have been economically accomplished. It is unquestionably true that the wide expansion of natural gas lines now under construction and proposed will bring prosperity and industrial development to communities far removed from gas fields.

These projects have been made possible mainly by the very great improvement that has taken place in construction methods and equipment which brought about the reduction of cost of large lines and reduced greatly the time required to complete them.

Many new factors enter into the building of large lines, beginning with the preliminary survey to the final testing of the finished line. The most modern means of transportation, the airplane, and highly developed telescopic photography have been brought into modern pipe line construction. In some of the rugged sections of the country it has been found practical and essential to make aerial surveys of the proposed route. By this means a reduction of the time required for the preliminary survey is accomplished and an opportunity is afforded for the selection of the most advantageous route. An aerial survey to include a strip four miles wide along the proposed location can quickly be made and will disclose most of the obstacles that would confront the construction work. With such a survey at hand it is possible at once to stake the best right of way, particularly in rough and mountainous country. The airplane is also used by some contractors for inspection of the proposed route, making more close inspection necessary only where rock may be encountered or unusual construction difficulties exist.

*Delivered before the Natural Gas Department of the American Gas Association, October 15, on the program of the A. G. A. 11th Annual Convention.

Fig. 4: Crawler-type tractor with boom.

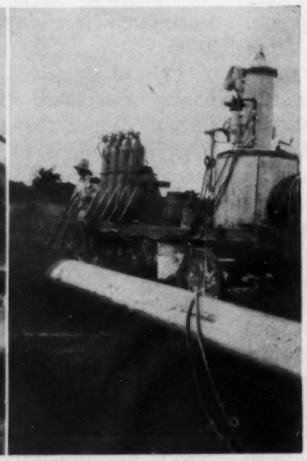


Fig. 5: Fully equipped generator wagon.

Following the survey the right of way is purchased and then the first step in the actual construction begins. Clearing the right of way immediately follows its purchase. Gates are built in fences, bridges constructed across creeks and timber cut so that stringing of the pipe may proceed.

At the railroad siding the pipe is unloaded from the cars directly to trucks (See Fig. 1). This is accomplished by the use of a gin truck, which is a truck with gin pole mounted on the rear. This gin pole has a long extension reaching over the truck to be loaded and to the railroad car, and is fitted with blocks, cable, and winch for lifting the pipe. Two men on the car place hooks in each end of a joint of pipe and the winch on the truck lifts the pipe from the car and places it in the truck where two men unfasten the hooks and the same procedure is repeated until the truck is loaded. Thus with five men, one of which is the driver of the stringing truck, more pipe can be unloaded from cars, much more rapidly and safely and with less damage to ends of pipe than with the old gin pole method with team or tractor.

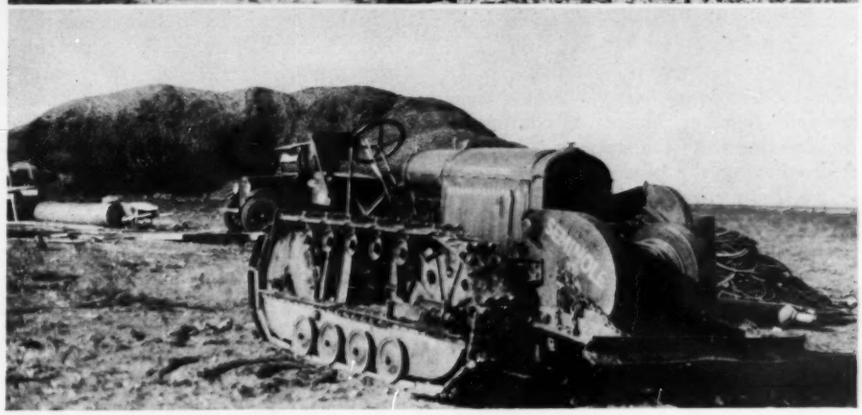
Stringing of the pipe can now be accomplished with large trucks even in rough territory by the use of caterpillar tractors to help in places where the trucks cannot move by their own power. Steep inclines, mud, small creeks and

many other obstacles that could not be traversed by trucks are now overcome with the additional help of the caterpillar tractor. Much time and consequently expense are saved where this can be done.

Ditching machines have gradually been improved until they are now capable of doing considerably more work than formerly (See Fig. 2). They are made much sturdier for main line work, weak places have been strengthened and improved steels and alloys are used in wearing parts, giving them practically an indefinite life where formerly these parts required replacing very often, resulting in expensive delays and shut down time. It is now usually customary to run ditching machines 24 hours each day on long pipe line projects, keeping open ditch for the laying crew.

Where rock is encountered blasting generally must be resorted to. Blasting methods and materials have also been given a great deal of study, bringing about better shattering of the rock with less explosive and holes spaced farther apart than formerly. Experience has taught these experts that different rock formation requires different treatment to accomplish best results. With competent workmen in this line, and with the use of portable air compressors for drilling the holes in the rock, much time and expense can be saved. It is possible to blast rock so that a ditching machine can remove the rock without unusual wear to the machine. A machine now used generally on this work is a shovel type pull stroke operated ditcher (See Fig. 3). This machine is similar to a steam shovel often used on sewer work, but is operated with a powerful gasoline engine. It will replace large numbers of men in rock work and is a big money maker where considerable rock is encountered. It is also very useful in making right of way for ditching machine in rolling and rough country and in making approaches for river and creek crossings.

In gas welded line construction as soon as the stringing is started the pipe is lined up on skids or dollies, five or nine joints in a line, and tacked in line for the roll welders or firing line. The number of joints lined up is controlled by the contour of the country and the welding crew. Since each generator wagon supplies gas for four welders, one wagon is used where five joints are welded together and two wagons in the case of nine joints. The pipe is lifted and placed on these skids by the use of a tractor equipped with pipe laying boom and hoist, which is one of the best time and labor saving devices on the job (See Fig. 4). This machine is of the crawler type with boom mounted on side. With this machine the lining up proceeds very rapidly and is followed by one welder who tacks the pipe joints to keep them in perfect alignment and at the same time provides the proper spacing between joints, which is held by the tacking.



ABOVE: Fig. 6. Testing cap used for making pressure test. BELOW: Fig. 7. Crawler-type tractor equipped with front end winch and anchor.

As soon as the lining up and tacking are started the firing line welders begin operations. A firing line crew is composed of four welders for five joints, or eight welders for nine joints, a generator man, one welder helper and a water wagon and driver. An extra welder is used for relieving the regular welders, where three or more crews are used. The helper distributes welding rod sufficient for each weld before the welding is started and rolls the pipe with tongs as the welding progresses. The equipment consists of a 100-pound acetylene generator for each four welders, mounted on a wagon which also has racks for eight oxygen bottles, a supply of welding rod, carbide, drinking water bucket and tools (See Fig. 5). The necessary oxygen and acetylene regulators, welding hose and torches are also included. The wagon is attended by a generator man who manipulates the oxygen bottles and operates the acetylene generator. The water wagon, for hauling and supplying water for the generator, is provided with water tank and hand pump. These welders make roll welds joining five or nine joints of pipe into one string. The pipe is rolled and the welding is done practically on the top of the pipe, until the entire girth weld is completed. The number of these welding units required is determined by the rapidity with which it is desired to build the line. As these firing line welders finish a section they advance to another section already prepared for them by the lining up crew and the tack welder.

The testing crew now fastens suitable air tight caps to each end of these long sections (See Fig. 6). These caps are provided with connections for pumping air into the pipe to 50 pounds gauge pressure, which is provided by a portable air compressor. After 50 pounds pressure has been reached, soap suds are applied to each girth weld and factory seam, and if leaks are found they are repaired. Seldom are leaks afterwards developed in the girth welds at higher pressures that are not discovered by this method. The compressed air is drained from one section to the next until the pressure equalizes, saving time and expense in running the compressor. All the welds, with exception of the tie-in welds, are thus tested above the ground, assuring a tight line when completed.

These sections are now rolled over the ditch and placed on skids with the use of winch tractors. The tractors are of the caterpillar type and with the winch are very powerful machines (See Fig. 7). They can move long sections of large diameter pipe with great ease and precision in either horizontal or longitudinal direction. With the assistance of boom and stiff leg tractor they line the pipe up ready for the tie-in or bell hole welds. These welds are called bell hole welds because a small bell hole is required so that the welder can get under the pipe to make the weld. The pipe is held above the ditch with skids, reducing the size of bell hole required. This is the only weld made where the pipe cannot be rolled. These sections welded together make a continuous welded line from the starting point.

In moving the pipe after welding it is good practice to handle it rather roughly, in order to put as much strain in the welds as possible, which should break any poor welds that may have been made. These welds are made having a greater tensile strength than the pipe itself, if proper material is used and experienced welders are employed, and will rarely break. Each weld is marked so that the welder who made the weld may be known in the case of a failure.

The necessary bends to make the pipe conform to the bottom of the ditch are made in these sections sometimes before the tie-in welds are made and often afterwards (See Fig. 8). The same methods cannot be used for bending large pipe of high or low carbon content, but either can be successfully bent by a skillful operator, without the least wrinkling or buckling of the pipe. The very best and most economical material to use for fuel for fire bending has been found to be discarded automobile casing rings. These are cut from junk tires by dealers from the inside rings of the casing. They can be placed in the ditch for any length to give a gradual sag bend or they can be hung over crotch skids on top of the pipe for an overbend. They are wire inserted and consequently will remain on the skids until burnt out, giving a concentrated heat where desired. Their particular advantage comes from their cheapness and the extremely hot and quick fire which they produce, reducing the cost and time required to make bends.

It is necessary to place slack in the line in order to keep the line under compression as much as possible, even with a drop in temperature, from that at the time the line is laid. This is accomplished by placing the pipe on slack skids approximately 500 or 600 feet apart and allowing the pipe to go down to the bottom of the ditch between these skids. These loops of slack are provided progressively with the tie-in welding, and material for the slack is obtained from the loose end ahead. The lowered sections are then backfilled in order to prevent the slack from moving ahead. Early in the morning when the temperature is at the lowest point, and the pipe therefore at its shortest length, these skids are pulled out by lifting the exposed pipe with a boom tractor, equipped with an adjustable stiff leg (See Fig. 9), and the pipe is crowded into the ditch. With the stiff leg this machine is capable of lifting 50,000 pounds. If the proper amount of slack has been provided the pipe will almost rest on the bottom and best results are obtained if surplus slack is provided requiring the pipe to be forced into the trench. This helps to assure that the pipe will still be under compression at any lower temperature.

The backfilling is done with a backfilling drag line machine (See Fig. 10), which is operated by two men who can fill over a mile of ditch for large pipe in a 10-hour day. One operator moves the machine forward while the other operates the drag line. In the hands of competent operators the mound is left even and all of the dirt thrown out by the ditching machine is back on the line. The bell hole welds are left open for inspection when full line pressure test is made.

In order to blow each section between gate valves and free the line from dirt accumulated during the construction, a rubber joint sleeve is provided on the inlet side of each gate valve. The line is raised and blown without damaging the gate valve. As soon as the section is cleaned, and at the same time purged of air, the pipe is lowered and the full line pressure or maximum working pressure applied. The section is tested for leakage by the Bureau of Mines shut in pressure method, using dead weight pressure gauges and accurate thermometers at each end of the section.

Highway and railroad crossings are cased with corrugated culvert pipe of larger diameter than the line in advance of the laying crew. Welded sections of pipe which have been tested for leaks are pulled through the culvert pipe with Seminole winch and welded to the preceding section as the laying progresses.

Pipe line protection is applied immediately after the roll weld tests are made in the case of cold applications and just before the lowering in when a hot application is used.

Another factor that is contributing to lower pipe line construciton costs is the physical examination of all men employed in such work. On one of the construction jobs which we now have under way we have required that each man pass a physical examination conducted by a competent physician. The physician is employed by us and is stationed on the job. Out of a total of 752 men examined for one crew, a total of 179 were rejected. Principal causes of rejection were as follows:

Potential hernia, hernia, hemorrhoids, varicocele, poor vision, high blood pressure, heart trouble and general physical condition.

This has given us not only a more physically fit construction crew, but has resulted in increased efficiency and also shows a potential saving on this job of approximately $18,600 (based on the Hartford Accident and Indemnity Com-

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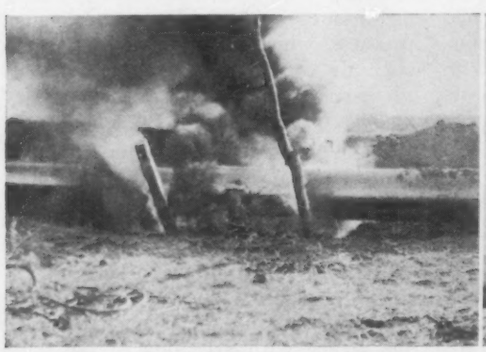
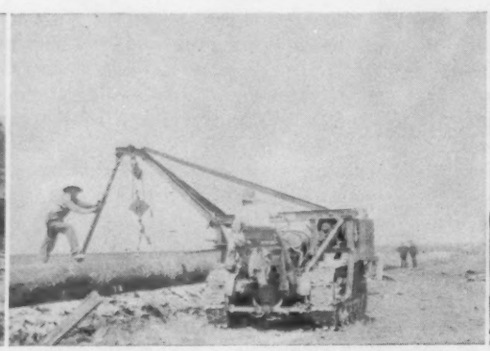
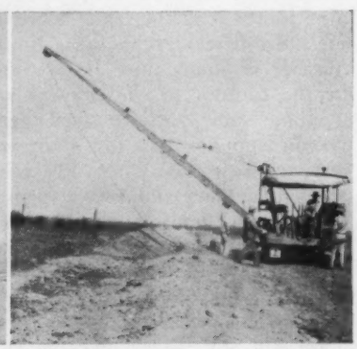
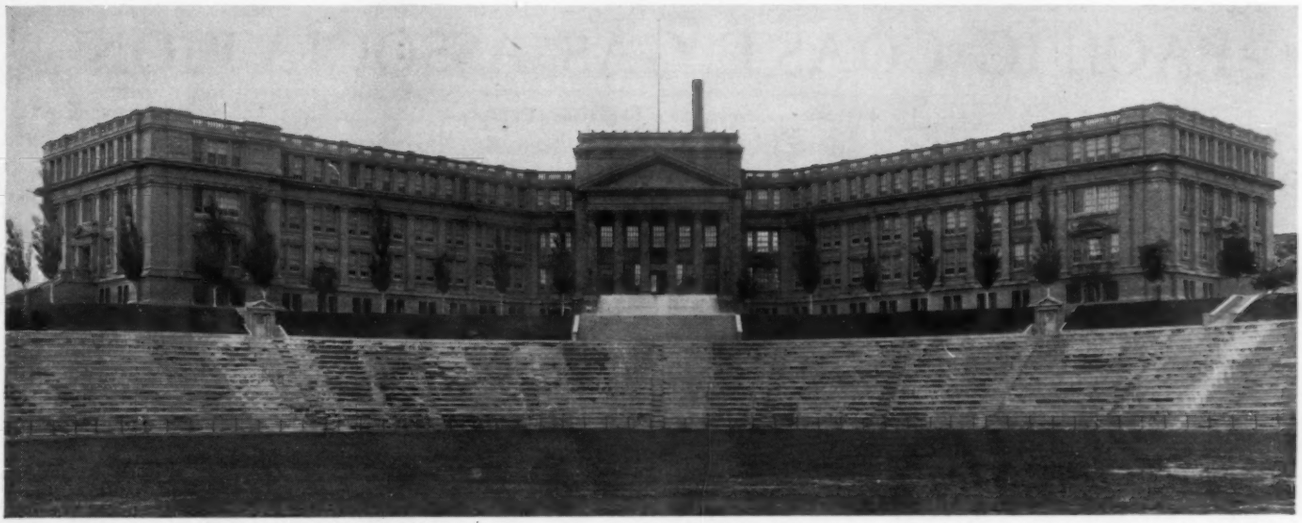






LEFT: Fig. 8. Making sag bend with rubber ring fuel—Note rings in foreground. CENTER: Fig. 9. Crawler-type tractor equipped with boom and adjustable stiff leg. RIGHT: Fig. 10. Dragline type backfiller.



Main High School, El Paso—one of 25 city schools sold to gas heat by the Texas Cities Gas Company

El Paso's Entire School Heating Load Turns *from* Solid Fuel *to* Gas

By CRAIG ESPY
Mid-Continent Manager, Western Gas.

EL PASO, Texas, "Where Sunshine Spends the Winter," is fast becoming an all-gas city following the advent of natural gas which was turned on around the middle of June, through the 200-mile line originating in the Lea County gas fields in southeastern New Mexico.

One of the outstanding conversion jobs which the Texas Cities Gas Company, local distributors of gas in El Paso, has secured to date, is a contract with the city school board for heating 25 city schools, composing the entire school system of the city.

Ordinarily on introducing natural gas to supplant existing fuels the gas company might have expected a trial contract from the school board for a few of the schools in the city system, particularly since natural gas has so recently been brought to El Paso. However, so thoroughly was the sales groundwork laid in El Paso that 100 per cent of the school load was secured to begin with the present school season.

Nine of the schools had formerly operated central heating plants on coal, purchased at a cost of $9.50 per ton. Total annual coal costs came to approximately $9,506. In 16 of the schools oil was burned, for which the school board was paying $1.68 per barrel, bringing the approximate total annual costs of oil to $3,192.

H. E. Danner, vice-president of the Texas Cities Gas Company, which has headquarters at Dallas, Texas, outlining the methods of procedure followed by the company's officials and engineers in selling the El Paso school load, lays emphasis upon the preliminary steps through which the company representatives went to convince themselves that gas would be more economical than the fuels in use. Each school heating system was analyzed in detail and an estimate of 32,000,000 cubic feet set up for annual consumption of natural gas by the school system. This figure represented approximate gross gas sales of $12,338, as compared to $12,698 for the combined cost of coal and oil used for previous heating.

Having established to their own satisfaction that natural gas could be introduced in competition with oil and coal and show a net saving, the gas company representatives were then in position to lay their cost estimates before the board and bring to bear the many added advantages offered by gas over solid fuels. The cleanliness factor held much weight with the school administration, for El Paso, in common with other communities, views its schools as show places and can see the desirability of keeping the buildings attractive as a matter of community investment. Controllability and quick availability of gas heat also commanded attention, while the saving of space formerly devoted to storage of coal and fuel oil, which space could be put to profitable school use either as classrooms or recreation rooms, also added strength to the gas company's argument. At the time of change-over to gas the schools using coal had 164 tons of that fuel on hand.

In selling El Paso to the use of gas for heating the gas company has faced strenuous organized opposition, originating largely among coal and oil dealers. Cooperative advertisements have been sponsored, aimed directly against the new fuel. An advertisement published over the signature of the coal dealers of the city carried the headline, "COAL with SAFETY and ECONOMY or GAS with DANGER and GREAT EXPENSE?" Among the chief points heralded in this advertisement was the hazard of asphyxiation. A sub-head in the advertisement read, "Warm Air Furnace Conversion Extremely Dangerous." The copy also dealt with "Inefficient and Expensive Conversions." But this type of appeal has met no more success in El Paso than in other cities where competitive fuel interests have attempted to put obstacles in the way of natural gas sales.

Costs of the change-over to natural gas, including equipment, amounted to about $5,000, the contract for this work

(Continued on Page 58)

PACIFIC COAST GAS ASSOCIATION

447 Sutter Street, San Francisco, California
A Department Conducted by Clifford Johnstone, Executive Secretary

San Francisco Regional Conference

NOVEMBER 21 and 22 are the dates for the San Francisco Regional Conference of the Association, which will provide a chance for committees to further their programs. and will also present a general session for all present at which a program of papers and discussions will be offered: On November 20 the cooperative advertising committee is holding a meeting at San Francisco.

For the committee, sectional and general sessions the following skeleton program is now available:

THURSDAY, NOVEMBER 21: Committee meetings as called by chairmen.

FRIDAY, NOVEMBER 22—FAIRMONT HOTEL:

9:30 A.M.

Separate meetings of Accounting, Commercial, Public Relations and Technical Sections.

12:00 NOON

Luncheon for all Sections.

Speaker: Paul M. Downing, First Vice-President, and General Manager, Pacific Gas and Electric Company.

2:00 P.M.

General session—all Sections. Among the papers to be read at this session are:

"Cooperation in Selling Gas-Fired Boilers through Heating Contractors"—W. L. Hoyt, American Radiator Company, San Francisco, Calif.

"An Intrinsic Property of Pipe Line Butt Welds"—L. T. Jones, Consulting Physicist, Berkeley, Calif. This paper will be illustrated by lantern slides.

C. S. Vance, Ex-Pres. of P. C. G. A., Dies

CHAMP S. VANCE, vice-president of the Los Angeles Gas and Electric Corporation, passed away suddenly on October 11, the victim of a heart attack while in his office. A. B. Day, president of the company, and O. W. Twichwell, chief special agent, were with Mr. Vance at the time of the seizure.

C. S. Vance

Mr. Vance was born in Abingdon, Virginia, July 10, 1864. In 1885 he came to California and was associated with the United States Engineering Corps under Major George B. Pickett, retracing old Spanish grants and investigating land frauds. From 1894 to 1897 he was deputy United States internal revenue collector.

In 1898 Mr. Vance entered the employ of the Los Angeles Lighting Company, a predecessor of the Los Angeles Gas and Electric Corporation, advancing rapidly through the positions of chief solicitor, special agent, manager of operations, and since 1913 had been vice-president and director of the company.

Mr. Vance was an outstanding figure in various activities of the gas industry, and was president of the Pacific Coast Gas Association during the years 1913 and 1914. He had long been prominent in the civic life of his city.

At Atlantic City for A.G.A. Annual Meeting

FOLLOWING is a list of Pacific Coast representatives attending the convention of the American Gas Association at Atlantic City:

A. B. Macbeth, Southern California Gas Company, Los Angeles.
F. H. Bivens, Southern Counties Gas Company, Los Angeles.
Jas. L. Stone, Spokane Gas and Fuel Company, Spokane, Washington.
Clifford Johnstone, Pacific Coast Gas Association, San Francisco.
D. L. Scott, Los Angeles Gas and Electric Corporation, Los Angeles.
Geo. Smith, Southern Counties Gas Company, San Bernardino.
Jay Jenkins, Western Gas, Los Angeles.
R. A. Hornby, Southern California Gas Company, Los Angeles.
H. C. McAllister, Southern California Gas Company, San Bernardino, Calif.
Lee B. Mettler, Lee B. Mettler Company, Los Angeles.
Frank Packer, Welsbach Company, San Francisco.
Geo. P. Egleston, H. R. Basford Company, San Francisco.
Otto Neisser, Ruud Water Heater Representative, Los Angeles.
Frank Mosher, Bryant Heater & Mfg. Company, San Francisco.
W. D. Dickey, Pacific Meter Works, San Francisco.
A. P. Bartley, W. J. Schoenberger Co., San Francisco.
Clarence Graham, Jas. Graham Mfg. Co., San Francisco.
B. W. Mueller, B. W. Mueller Co., San Francisco.

A. E. Higgins to Work with Coop. Adv. Committee

CAPTAIN A. E. HIGGINS, field representative for the Commercial Section of the American Gas Association, will return to the Pacific Coast about November 15. In addition to continuing his work of aiding gas company sales departments in furtherance of the A. G. A. Blue Star Home program he will also work with the Pacific Coast Gas Association cooperative advertising committee, assisting member companies of the P. C. G. A. to tie their efforts most effectively into this coast-wide program now in progress.

J. H. FAGG TO HAVE CHARGE OF DE SABLA DIVISION

J. H. Fagg, formerly of Stockton, has been named manager of the De Sabla Division of the Pacific Gas and Electric Company at Chico, California, succeeding I. B. Adams, who was transferred to the San Jose Division of the company to fill the position left vacant by the death of John D. Kuster.

SEATTLE LIGHTING CORP. BOUGHT BY CENTRAL PUBLIC SERVICE

According to press dispatches late in October, announcement has been made of the purchase of the Seattle Lighting Company, of Seattle, Washington, by the Central Public Service Corporation, with headquarters in Chicago, Illinois.

E. A. KEY COMPANY MOVES TO NEW OFFICES

E. A. Key Company of Los Angeles, California, Western representative of the Key Boiler Equipment Company, has moved its offices from 1431 Santa Fe Avenue to 2814 Santa Fe Avenue.

TABLE NO. 3

FOR DETERMINING OPEN FLOW OF GAS WELLS FROM SIDE STATIC PRESSURE FOUR DIAMETERS FROM OPENING

SIDE STATIC PRESSURE		OPEN FLOW IN M CUBIC FEET PER DAY								
Inches of Mercury	Pounds per Sq. Inch	1"	2"	3"	4"	5"	6"	8"	10"	12"
5.		706	2820	6340	11300	17600	25300	45100	70400	101000
5.5		714	2860	6430	11400	17900	25700	45700	71400	103000
6.	3	725	2900	6530	11600	18100	26100	46400	72500	104000
6.5		735	2940	6620	11800	18400	26500	47000	73500	106000
7.		745	2980	6710	11900	18600	26800	47700	74500	107000
7.5		754	3020	6790	12100	18900	27100	48300	75400	109000
8	4	764	3,060	6,880	12,200	19,100	27,500	48,900	76,400	110,000
8.5		775	3,100	6,980	12,400	19,400	27,900	49,600	77,500	112,000
9.		784	3,140	7,060	12,500	19,600	28,200	50,200	78,400	113,000
9.5		795	3,180	7,160	12,700	19,900	28,600	50,900	79,500	114,000
10.	5	805	3,220	7,250	12,900	20,100	29,000	51,500	80,500	116,000
11.		825	3,300	7,430	13,200	20,600	29,700	52,800	82,500	119,000
12.	6	845	3,380	7,610	13,500	21,100	30,400	54,100	84,500	122,000
13.		865	3,460	7,790	13,800	21,600	31,100	55,400	86,500	125,000
14.	7	885	3,540	7,970	14,200	22,100	31,900	56,600	88,500	127,000
15.		906	3,630	8,160	14,500	22,700	32,600	58,000	90,600	130,000
16.	8	926	3,710	8,340	14,800	23,200	33,300	59,300	92,600	133,000
17.		945	3,780	8,510	15,100	23,600	34,000	60,500	94,500	136,000
18.	9	966	3,870	8,700	15,500	24,200	34,800	61,800	96,600	139,000
19.		986	3,950	8,880	15,800	24,700	35,500	63,100	98,600	142,000
20.	10	1,013	4,050	9,120	16,200	25,300	36,500	64,800	101,000	146,000
22.	11	1,055	4,220	9,500	16,900	26,400	38,000	67,500	106,000	152,000
24.	12	1,095	4,380	9,860	17,500	27,400	39,400	70,100	110,000	158,000
26.	13	1,137	4,550	10,200	18,200	28,400	40,900	72,800	114,000	164,000
28.	14	1,178	4,710	10,600	18,800	29,500	42,400	75,400	118,000	170,000
30.	15	1,218	4,870	11,000	19,500	30,500	43,800	78,000	123,000	175,000
	16	1,260	5,040	11,300	20,200	31,500	45,400	80,600	126,000	181,000
	18	1,343	5,370	12,100	21,500	33,600	48,200	86,000	134,000	193,000
	20	1,424	5,700	12,800	22,800	35,600	51,300	91,100	142,000	205,000
	25	1,629	6,520	14,700	26,100	40,700	58,600	104,000	163,000	235,000
	30	1,834	7,340	16,500	29,300	45,900	66,000	117,000	183,000	
	35	2,041	8,170	18,400	32,700	51,000	73,500	131,000	204,000	
	40	2,245	8,980	20,200	35,900	56,100	80,800	144,000	225,000	
	45	2,450	9,800	22,100	39,200	61,300	88,200	157,000	245,000	
	50	2,657	10,600	24,900	42,500	66,400	95,700	170,000		
	60	3,067	12,300	27,600	49,100	76,700	110,000	196,000		
	70	3,476	13,900	31,300	55,600	86,900	125,000	222,000		
	80	3,887	15,500	35,000	62,200	97,200	140,000	249,000		
	90	4,298	17,200	38,700	68,800	107,000	155,000			
	100	4,708	18,800	42,400	75,300	118,000	169,000			
	120	5,531	22,100	49,800	88,500	138,000	199,000			
	150	6,762	27,000	60,900	108,000	169,000				
	200	8,810	35,200	79,300	141,000	220,000				

Measuring Open Flow *of* Gas Wells

(Continued from Page 34)

at least 8 diameters long and should be free from burrs or other obstructions. Hold tip of tube in the plane of the opening and in line with the center of the nipple. For routine testing, the well should be blown for the customary length of time (usually 15 minutes). Take Pitot tube reading and determine open flow from tables. Use the nearest value found in the tables. Do not interpolate for other pressures. If the correct diameter is not found in the tables, multiply the value for 1-inch opening by the square of the actual diameter.

In testing new or unfamiliar wells, take first reading of Pitot tube after well has blown 10 minutes. Five minutes later take another reading. If this second reading checks the first, it should be accepted as the correct test. If it is less than the first reading, continue taking readings at 5-minute intervals until no appreciable decline is noted. In reporting open-flow tests, always give the length of time the well was blown.

When testing very large wells and wells that make shale on rock, it is frequently impossible to obtain a satisfactory test with a Pitot tube. In such cases, the static pressure on the flow nipple should be determined while the well is open. The test nipple must be at least 8 diameters long. The pressure connection should be made on the nipple at 4 diameters from the end. Be sure there are no burrs left on the inside of the pipe and that the pressure connection does not project inside the pipe wall. Use Table No. 3 to determine open-flow.

ACKNOWLEDGEMENTS

The investigations on which this paper is based were made possible by the cooperation of Mr. M. A. Hardey and Mr. J. W. Bartlett of the Houston Gulf Gas Company. The writer was assisted in the conduct of the experiments and in the calculations by Mr. V. H. Gohlke of the Houston Gulf Gas Company, Mr. Terry Gill of the Lone Star Gas Company and Mr. Joe D. Reid of his own organization. The writer's thanks are also due to the officials of the Lone Star Gas Company for the loan of men and equipment for this work.

Outdoor Cooking School

(Continued from Page 37)

A newspaper advertisement (reproduced with this article) following the series of open-air lectures featured the record attendance.

Vacant land adjacent to the playground was rented to provide free parking space for those attending the classes.

Boy Scouts in uniform were employed to direct traffic and to usher the ladies to seats, at the same time handing to each lady attending a copy of the daily recipe sheet and a prize card.

A very important feature of the open air cooking school was the fact that many women were able to attend with their children, who would not otherwise have been able to do so, the reason for this being that the children who could not be kept quiet in an enclosed place of meeting were turned over to the playground attendants, enabling the mothers to pay full attention to the cooking lectures.

As to the effectiveness of the cooking course during what would under other conditions have proved unfavorable weather; at a time when many residents were absent on vacations, and also at a time when a large proportion of the women residents were participating in the picking and packing of pears (for which Medford is famous) the following attendance record is submitted:

August 13th	325
August 14th	430
August 15th	515
August 16th	640

(In considering these figures, it must be born in mind that the population of Medford is 13,000.)

The true measure of the success of any form of advertising naturally lies in the ensuing results. While it is not possible at this time to estimate the actual dollars and cents value of appliance sales resulting, or to result, from the cooking course, the number of pros-

Open-Air Cooking Course Attendance Record

We are pleased

325 TUESDAY

With the attendance record at our open-air cooking course—It shows that the women of Medford are interested in cooking the better way—with GAS, the Instant—Clean—Convenient and Modern—up-to-date fuel.

430 WEDNESDAY

Delicious Meals Always... On a Gas Range

515 THURSDAY

Not only are they interested in GAS for cooking, but, also in its application to refrigeration. The GAS refrigerator makes endless, noiseless cold — It contains no machinery, therefore, no wear—GAS refrigeration costs no more to buy and actually less to operate than any other kind of automatic refrigeration.

640 TODAY

Let us give you monthly figures for Medford. If you desire, we can arrange for a small down payment and convenient terms.

Southern Oregon Gas Corporation

200 West Main St. K. I. DAKEY, Gen. Mgr. Phone 936

This advertisement told Medford citizens how cooking school attendance stepped up each successive day.

No. 1239

PRIZE CARD

Please return this coupon—it gives you a chance on the daily prizes and also on the Grand Prize to be given away by the Southern Oregon Gas Corporation on the final day of the

SOUTHERN OREGON GAS CORPORATION

MEDFORD MAIL TRIBUNE

COOKING COURSE

Name .....

Address .....

Type Range Now Using
( ) Coal-Wood
( ) Gas
( ) Electric

Are You Interested In
( ) Gas Range
( ) Gas Refrigerator
( ) Gas Water Heater
( ) Gas Heating

We appreciate your attendance at this cooking course and welcome your suggestions, based upon our desire to render to you the best service possible.

SOUTHERN OREGON GAS CORPORATION

Ashland — Medford — Grants Pass— Roseburg

No. 1239

Attendance prize cards used at Medford Cooking School.

pects for appliance sales (after eliminating duplications, etc.) stands as follows:

Gas ranges	112
Gas refrigerators	45
Gas water heaters	29
Gas heating	24
Total	210

Many sales have actually been effected in the two months following the cooking course, but by far the most important results accruing to our company are found in ensuing increase of "gas consciousness" in a community which is unusually and peculiarly e l e c t r i c a l l y minded.

Our business today is 33 1-3 per cent greater than it was a year ago, and through such agencies as the outdoor cooking school we aim to supply further stimulus to gas sales in our territory.

CONSUMERS' GAS CO. TO SERVE CALIFORNIA TOWNS

The Railroad Commission of California late in September, granted to the Consumers' Gas Company a permit to serve gas for domestic, commercial and industrial purposes in the cities of Los Banos and Gustine in Merced County, and Newman and Patterson in Stanislaus County, and has authorized the company to exercise franchise rights given by the cities and counties involved.

For the purpose of financing its undertaking the Railroad Commission has authorized the Company to issue and sell on or before March 31, 1930, $190,000 of six per cent first mortgage bonds and $150,000 of common capital stock.

The Rate Complex: *A Playlet*

(Continued from Page 30)

(Jackson and Hutchins both exit and meet in the hall).

MR. JACKSON: Hello, Bob, where are you going.

MR. HUTCHINS: Oh it's you, Mortimer *(he steps back one or two paces and eyes Jackson attentively)* Say, Jackson, is your golf game as rotten as the letters you write?

MR. JACKSON: You might ask the Chairman of the Board, Bob. I was out with him yesterday.

MR. HUTCHIN *(in amazement):* The Chairman of the board . . . . Come along Mortimer, we'll discuss this at the 19th hole. *(they exit).*

(In a few seconds Hutchins rushes back into the room, searches through the waste basket, retrieves Jackson's reports and places them carefully on his desk. Rushes out immediately, calling).

MR. HUTCHINS: Coming, Mortimer.

(At this time Mr. York enters the room).

MR. YORK *(to Miss White):* Where is Mr. Hutchins?

MISS WHITE: He and Mr. Jackson just left for a conference.

MR. YORK: Where?

MISS WHITE: I believe at the Country Club.

MR. YORK *(thoughtfully):* At the Country Club . . . . *(glances at reports on Hutchins desk).* What's this Miss White?

MISS WHITE: That's some data he requested from Mr. Jackson.

MR. YORK *(rubs his hands ecstatically):* That's real progress, Miss White. A fine spirit of cooperation, thanks to the great game. Do you know, if it wasn't for their golf complex, I'd never get a lick of work done around here.

I prophecy, Miss White, that golfing will play an increasingly important part in our business affairs during the next 20 years, along with conventions and rate reforms. There's only one thing I fear, and that's the possible appointment of a member of some Handicaps Committee on the Rate Committee. That would be the devil of a mess. *(Looks at watch).* I must run, Miss White, I am going to join the conference.

A. W. YOUNG
"Mr. Hutchins"

H. LENNINGER
"Mr. York"

GEO. V. LACEY
"Mr. Jackson"

TRI-UTILITIES CORPORATION PLANS ADDITIONAL FINANCING

Tri-Utilities Corporation, holder of the majority of the common stock of Southern Natural Gas Corporation, as well as the common stock of United Power Gas and Water Corporation, which owns 79 per cent of the Class B stock of Federal Water Service Corporation and 100 per cent of the Class B common stock of Peoples Light and Power Corporation, is planning additional financing to the extent of approximately $12,000,000, according to announcement.

Upon completion of the financing the company will acquire, according to George L. Ohrstrom, president, the remaining 21 per cent of the outstanding Class B stock of Federal Water Service Corporation, a large amount of 6½ per cent convertible sinking fund gold debentures, series of 1944, of Southern Natural Gas Corporation and controlling interest in the voting stock of the American Natural Gas Corporation, the holding company for the Oklahoma Natural Gas Corporation. The combined assets of the corporation and its subsidiaries following this acquisition will be approximately $290,000,000. Properties will be operated in 26 states and water, electricity, manufactured and natural gas will be served.

PUBLIC SERVICE CORPORATION WILL SUPPLY MORE TOWNS

The Public Service Corporation of Texas is constructing supply and distribution lines to connect Higgins, Perryton, and Spearman, Texas, and Shattuck and Gage, Oklahoma with its natural gas system. Service is expected by November 20. The Pampa gas fields will furnish the supply.

Optimism Keynote *of* A. G. A. Sessions

WITH a new high record for attendance and a distinctly modern and optimistic atmosphere, the Eleventh Annual Convention of the American Gas Association convened at Atlantic City, New Jersey, on October 14. Nearly 6,000 delegates registered for the sessions, the attendance showing a 27 per cent gain over that of 1928. The new Municipal Auditorium proved an ideal meeting place, with its large convention hall and spacious booths for the record exhibition of appliances and industrial equipment. It was with enthusiasm that the delegates greeted the announcement that the 1930 convention also will be held at Atlantic City.

General and sectional sessions, convention entertainment and exhibits were all housed under the same roof, affording a maximum of convenience to those attending. As usual, there were individual sessions for the seven sections, as well as for the Natural Gas Department. A Women's Meeting was also held. The three general sessions and the evening session, a part of which was broadcast over the N.B.C. network, were of their usual high character, featuring a number of national speakers. Included among these were: Hon. James J. Davis, Secretary of Labor of the United States; Miss Laura Cauble, chairman of the National Conference on Sanitation; Hon. Lewis E. Gettle, chairman of the Wisconsin Railroad Commission; and Dr. George Edgar Vincent, president of the Rockefeller Foundation. Sir David Milne-Watson, managing director of the Gas Light and Coke Company of London, England, spoke through the trans-Atlantic Telephone, amplified through convention hall.

During the first general session, the report of the nominating committee was read, and the nominations accepted unanimously. B. J. Mullaney, a vice-president of the Peoples Gas Light and Coke Company of Chicago, Illinois, was named to head Association activities for the year 1929-30, and will be assisted by the following:

Vice-President—Clifford E. Paige, vice-president, The Brooklyn Union Gas Company, Brooklyn, N. Y.

Treasurer—William J. Welsh, president, New York and Richmond Gas Company, Stapleton, Staten Island, N. Y.

Directors—Two-Year-Term—H. C. Abell, Electric Bond and Share Company, New York, N. Y.; J. S. DeHart, Jr., Isbell-Porter Company, Newark, N. J.; F. C. Freeman, Providence Gas Company, Providence, R. I.; R. W. Gallagher, East Ohio Gas Company, Cleveland, O.; Arthur Hewitt, Consumers Gas Company of Toronto, Toronto, Ont., Can.; F. T. Hulswit, American States Securities Corp., New York, N. Y.; A. B. Macbeth, Southern California Gas Co., Los Angeles, Calif.; P. S. Young, Public Service Electric and Gas Company, Newark, N. J.; Fred A. Miller, S. R. Dresser Mfg. Company, Bradford, Pa.

The Natural Gas Department will be led by H. C. Morris of the Dallas Gas Company, Dallas, Texas, as chairman. He will be assisted by H. C. Cooper, Hope Natural Gas Company, of Pittsburgh, Pennsylvania, vice-chairman. Members of the Managing Committee elected were: For two-year term; L. K. Langdon of Cincinnati, Ohio; H. L. Montgomery, Bartlesville, Oklahoma; J. B. Tonkin, Pittsburgh, Pennsylvania; M. W. Walsh Louisville, Kentucky; Wm. Moeller, Jr., Los Angeles, California, and Geo. Welker, Oil City, Pennsylvania. For one-year term, to fill the unexpired term of H. C. Cooper, J. R. Munce, of Pittsburgh, Pennsylvania.

B. J. Mullaney, President-elect of Amer. Gas Ass'n.

H. C. Morris Chairman, Natural Gas Department

Departmental and Section chairmen are as follows:

Accounting Section: Chairman—J. L. Conover, The Public Service Electric and Gas Co., Newark, N. J.; vice-chairman—J. I. Blanchfield, The Brooklyn Union Gas Co., Brooklyn, N. Y.

Commercial Section: Chairman—Geo. E. Whitwell, Equitable Gas Co., Pittsburgh, Pa.; vice-chairman—E. R. Acker, Central Hudson Gas and Electric Corp., Poughkeepsie, N. Y.

Industrial Gas Section: Chairman—C. C. Krausee, Consolidated Gas Electric Light and Power Co. of Baltimore, Md.; vice-chairman—D. W. Chapman, The Peoples Gas Light and Coke Co., Chicago, Ill.

Manufacturers' Section: Chairman—F. G. Curfman, Improved Equipment Co., New York, N. Y.; vice-chairman—E. S. Dickey, Maryland Meter Works, Baltimore, Md.

Publicity and Advertising Section: Chairman—James M. Bennett, Philadelphia Electric Co., Philadelphia, Pa.; vice-chairman—Donald M. Mackie, Allied Power and Light Corp., Jackson, Mich.

Technical Section: Chairman—B. F. Pfeiffer, The United Gas Improvement Co., Philadelphia, Pa.; vice-chairman—R. G. Griswold, Cities Service Co., New York, N. Y.

The Natural Gas Department voted at its special session to continue the practice of holding annual meetings of the Department. Announcement of the time and place of the 1930 meeting will be made by *Western Gas* as soon as the information is available.

During the general session on October 16, Nils T. Sellman, assistant to the vice-president in charge of sales and utilization for the Consolidated Gas Company of New York, was presented the Charles A. Munroe Award of the Association. This award is given by Charles A. Munroe, president of the New York Oil Company of Chicago, Illinois, as a recognition of outstanding service to the gas industry during the Association year. It was given to Mr. Sellman for his work in the development of the gas refrigerator.

Fifteen McCarter Medals for life-saving were given at this session. This medal is donated by Thomas N. McCarter, president of the Public Service Corporation of New Jersey, and is awarded for saving life in cases of asphyxiation.

Resolutions passed by the Association at its 11th convention included one of congratulation to Thomas Alva Edison for his 50 years of achievements, upon which the electrical industry has been built. A second resolution approved the measures taken for effective conservation of natural gas, and mentioned the formation of a committee in the Natural Gas Department which was formed for the purpose of cooperating with governmental and other agencies in this undertaking.

The exhibition of appliances and equipment which filled the largest room of the auditorium testified to the increase in the use of "Gas—the Modern Fuel." Nearly 300 exhibitors offered the newest of their lines for the scrutiny of Association members and guests. Ample space was provided for all displays. C. W. Berghorn and Wm. De Frietas were in charge of the exhibit, assisted by K. C. Farnsworth of Athens, Ohio; Stanley Little, St. Louis, Missouri; Fred A. Miller, of Bradford, Pennsylvania; and Harry P. Roth, of Pittsburgh, Pennsylvania.

R. C. BOUGHTON JOINS STAFF OF McEVERLAST, INC.

ROGER C. BOUGHTON, for several years past gas distribution engineer for the Los Angeles Gas and Electric Corporation, has been appointed manager of the pipe line department for McEverlast, Inc., it was announced late in October. With Mr. Boughton's appointment McEverlast supplements its inspection service, which has been available to its customers, with an engineering service. All pipe line activities of the company are to be centered under Mr. Boughton's direction. His duties will include personal assistance in solving gas, pipe line, and corrosive problems of McEverlast clients.

R. C. Boughton

Mr. Boughton is 37 years of age and has had a wide and varied experience beginning with his early work as a pipe fitter's helper, in California oil fields, and as draftsman with the Pacific Gas and Electric Company, with which utility he advanced to the position of designer and later to that of construction engineer.

Leaving the P. G. and E. he entered government service with the Emergency Fleet as technical assistant, later to serve the Union Oil Company of Delaware in the East, then the Pan-American Petroleum & Transport Company as a supervising engineer. His experience also includes European travel as an engineering observer for private interests. He was for a short time gas distribution superintendent for the King's County Lighting Company of New York, leaving that position to join the Los Angeles Gas and Electric Corporation staff.

With *the* Metermen

84 Attend Nov. Meeting *of* S. C. M. A.

EIGHTY-FOUR Southern California Meter Association members and visitors sat down to the Association's October 24 dinner meeting at the Elite Cafe, Los Angeles. Most of the organization's permanent committees had held meetings during the month past and President R. F. Angell called for reports from V. E. Schultz, chairman of the membership committee; Ralph Cook, chairman of the program committee, and T. K. M. Smith, chairman of the standards committee. B. G. Williams, vice-president of the S. C. M. A., presented a financial report, showing the Association's balance to be in healthy condition. Another development of the October 24 meeting was the preliminary report of a new department—the "Gadget Club"—as announced elsewhere on this page.

Two papers provided an excellent program and each was followed by extended discussion. "The Importance of Water Vapor in the Measurement of Gas Under a Vacuum" was the subject dealt with by P. W. Hill of the General Petroleum Corporation. U. A. Hammett of The Permutit Company presented a description of "The Ranarex Specific Gravity Recorder" which was illustrated with slides and a working model.

The letter of announcement sent the membership in advance of the October meeting by G. S. Duncan, secretary, enclosed two data sheets prepared by the standards committee.

November 21, the third Thursday in the month, has been set for the next S. C. M. A. session, due to the fact that Thanksgiving falls on November 28, the fourth Thursday, customary meeting date for the group.

Gadget Club Gets Under Way *in* November

DESIGNATED as a "clearing house for useful ideas," the Gadget Club—a department of the Southern California Meter Association—came into being last month, and was introduced to the S.C.M.A. membership at the October 24 meeting. Carl W. Brockman of the Union Oil Company has been chosen to chairman this activity, with the assistance of H. E. Thompson, Los Angeles Gas and Electric Corporation, as vice-chairman, and a committee representative of the various companies and departments of interest in the Association has been named to conduct the "gadget" activity.

Briefly, the purpose of the Gadget Club is to encourage all S.C.M.A. members to look about for practical ideas, contrivances and methods useful in measurement work, and to submit informal descriptions to the Gadget Club committee. These will be eligible for prizes (first prize, $10 in cash; second, Natural Gas Handbook, by Diehl; third, a leather-covered Lefax handbook; other prizes) to be assigned by a committee of five judges on a basis of merit. It is hoped that in many cases these brief descriptions may be read before the Association at monthly meetings.

Orifice Meter Plates

By T. K. M. SMITH

Industrial Fuel Supply Company
*Chairman, S.C.M.A. Standards Committee**

THE subject of orifice meter plates, familiar as it is to us, is of vital concern to those interested in the volumetric measurement of gases and liquids by the improved type of orifice meter. The following has therefore been written with the purpose of studying and discussing the many phases of orifice meter plates, touching upon the various sizes and makes of plates together with their construction, design, dimensional values, accuracy, care, uses, etc. It is hoped that the presentation of this discussion may promote the collection of additional useful information relating to orifice meter plates and their use, as a part of the work being conducted by the Standards Committee of this Association. It is hoped that ultimately there may be secured a general recognition of an accepted standard orifice meter plate, its specifications and conditions of use meeting with the Association's approval as representing the most accurate means of obtaining true pressures and volumetric determinations of gases and liquids in measurement by the orifice meter. The desire for this substantial and guiding information can be regarded as a long-felt need.

T. K. M. Smith

To impede the flow of a gas or liquid when contained within a pipe line by means of installing, between a pair of companion flanges or in a special fitting, a thin plate or disc into which there has been cut a figurate opening or orifice, circular in design, the diameter of which is smaller than the internal diameter of the pipe itself, offers the medium for creating the pressure drop, or commonly termed "differential," which is the basis for calculating amounts of gas in and out of transmission lines, distribution systems, wells, compressor and gasoline plants.

It is further pointed out that, to more fully appreciate the value of an accurate and specified orifice meter plate, the quantity of gas measured in one hour by an orifice meter is expressed in the following formula:

$$Q = C\sqrt{hP}$$

Where:

Q = Quantity of gas in standard cubic feet passing through the meter per hour.

C = Orifice meter coefficient, corrected for actual flow conditions of the gas, such as temperature, specific gravity, etc.

h = Differential in inches of water as recorded by the red pen on the meter chart.

P = Line or static pressure in pounds per square inch absolute. This is equal to the gauge pressure as recorded by the black pen on the meter chart, plus the atmospheric pressure at the point of measurement.

We devote a great deal of attention to the other departments necessary in gas and liquid measurements, and while it is true that the apparatus consisting of the meter gauge and other moving parts, from which we obtain certain pressure records, is wholly deserving of consideration, the fact remains that the orifice meter plate does a work of extreme importance, and just what takes place at this particular point of contact must be emphasized as a most essential factor.

The record which is made on the chart, no matter how true and exacting it is (within the confines of the recording instrument or gauge), is a direct function of what occurs at the orifice in the line, and any mechanical inaccuracies or defects at this particular location might greatly influence the accuracy of measurement results.

Care of the Orifice Meter Plate: Since the orifice meter plate is the foundation for securing accurate fluid measurements, the proper care and handling of this device becomes of great importance. Care should be exercised in the removal of the plate from the meter run, and also in its transportation and storage.

When a meter disc is first taken out of service, it should be at once washed with distillate or gasoline. This cleansing liquid is generally available at most locations where meters are found. After this has been done, it should be lightly covered with grease or oil to prevent the formation of rust. In numerous cases it will be found that in measuring unclean or wet gas, particles of dirt, moisture and other foreign matter collect on the plate, particularly on the upstream side or face, and the adherence of such a deposit will in due time cause rust and other damaging effects. This agency of destruction, when in contact with the plate, attacks the upstream sharp corner edge and the face of the orifice and will in time cause an irregular and untrue opening. An orifice plate employed in this condition for creating differential pressures will have a tendency to influence the quantity of flowing fluids in varying inaccurate proportions.

Transportation of Orifice Meter Plates: Many gas, gasoline and oil companies have

*Presented before the September 26, 1929, meeting of the Southern California Meter Association.

adopted the practice of storing plates at a central point or warehouse, and in bringing plates in from the fields for this purpose it is recommended that suitable means be provided for their protection. While many ideas have merits of practical application in this respect, it has been found that a rack consisting of a threaded metal spindle mounted in a 2-inch board, about 12 inches square, meets with general approval. It requires but a minimum of space and has the advantage of holding a number of plates at a time. A butterfly nut or clamp, with a tension spring, run over the spindle will lock the plates in place, thus further insuring their safety. A rubber guard on the spindle will protect the orifice from becoming nicked and damaged.

Another handy means of transporting plates is that of a specially constructed box consisting of several compartments in which individual plates might be allowed to rest. This design of receptacle can be attached to the running board of an automobile quite conveniently, and can also be made to suit individual requirements.

Storage of Orifice Meter Plates: When plates are brought in to be stored for future use, several methods can qualify as to practicability. Storage should be in order of orifice size. File racks can be so constructed as to hold any desired number of plates, including those that are used in the Robinson orifice fitting.

If ample wall space is available in the storeroom, storage can be maintained in a convenient manner by hanging the plates on pegs or hooks. To employ this system, holes should be drilled in the handles of the plates for this purpose, for it might be injurious to attempt to suspend them using the orifice. Several plates can be hung on each peg and can be classified as to their orifice size. Pegs offer sufficient protection against the plates becoming damaged.

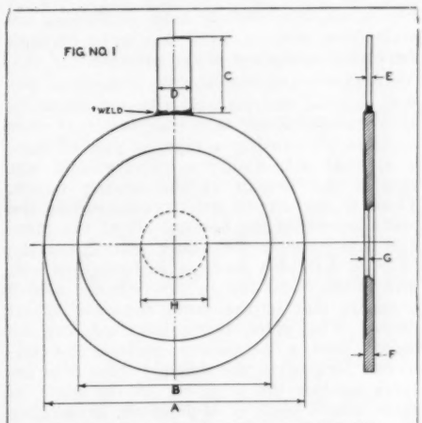
Bevel Edged Plates: One of the most common types of orifice meter plate used in gas measurement is that with the bevel edge, it having been adopted and regarded as somewhat of a standard, growing out of the capacity tests made in the plant of the Metal Works at Erie, Pennsylvania, in 1913.

While this particularly designed orifice plate has proven its worth, many being in use at the present day, it might be said that the bevel edged plate has been somewhat superseded by the straight edged plate, a description of which appears later in this paper.

Bevel edged plates can only be used when the flow of gas or liquid is in one direction. Flowing a gas or liquid through a plate with the bevel placed on the upstream side has a marked effect upon the true quantity passing through the meter, and invariably the results obtained will be lower than the true amounts. This design of plate can be used both for flange and line connections.

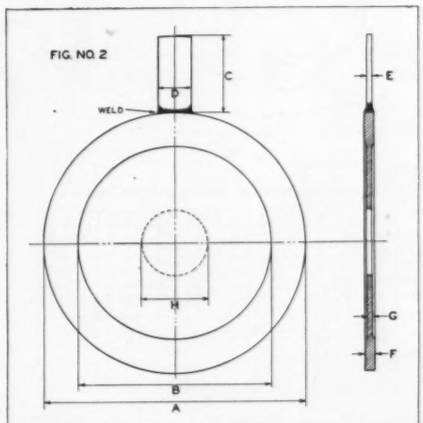
This particular plate is beveled at the orifice on the downstream or outlet side, at an angle of 45°, as shown in Fig. 1. This cut is so made as to allow the face of the orifice or the cylindrical portion to be flat for the desired width. Referring to Fig. 1, the dimension "G" can be considered as a variable, it changing with the size of the orifice "H."

It has been recommended by some measurement engineers, that the cylindrical portion or face of the orifice "G" should not exceed 10 per cent of the diameter of the orifice "H," and for this reason the bevel is thus made. Quoting John C. Diehl of the Metric Metal Works, page 175, Natural Gas Handbook, the width of the cylindrical portion of the orifice should not be greater than 10 per cent of the diameter of the orifice, and if a plate is thicker than this amount, the downstream edge of the orifice should be bevelled off at an angle of 45° so as to fulfill the preceding recommendations. This rule should be followed where the orifice sizes are smaller than 1¼ inches in diameter; however, the Standards Committee feels that this is a point that warrants further discussion.



STANDARD BEVEL EDGE ORIFICE METER PLATES

SIZE	A STAND	A EX. HVY.	B	C	D	E	F	G	H
2"	4 3/8"	4 3/8"	2.067	5"	1 1/2"	1/8"	1/4"	1/8"	-
3	5 3/8	5 3/8	3.068	"	"	"	"	"	
4	6 3/8	7 3/8	4.026	"	"	"	"	"	
6	8 3/8	9 3/8	6.065	"	"	"	"	"	
8	11 -	12 1/8	8.071	6"	"	"	"	"	
10	13 3/8	14 1/2	10.191	"	"	"	"	"	
12	16 1/8	16 1/2	12.000	"	"	"	"	"	
16	20 1/4	21 1/4	15.25	"	"	"	"	"	



STANDARD STRAIGHT EDGE ORIFICE METER PLATES

SIZE	A STAND	A EX. HVY.	B	C	D	E	F	G	H
2"	4 3/8"	4 3/8"	2.067	5"	1 1/2"	1/8"	1/4"	1/8"	-
3	5 3/8	5 3/8	3.068	"	"	"	"	"	
4	6 3/8	7 3/8	4.026	"	"	"	"	"	
6	8 3/8	9 3/8	6.065	"	"	"	"	"	
8	11 -	12 1/8	8.071	8"	"	"	"	"	
10	13 3/8	14 1/2	10.191	"	"	"	"	"	
12	16 1/8	16 1/2	12.000	"	"	"	"	"	
16 OD	20 1/4	21 1/2	15.25	"	"	"	"	"	

The only objection found where "G" is kept at ⅛ of an inch, is that in large-sized plates, say 16 inches or greater, there may be a possibility of the plate buckling or warping. The upstream side of the bevel edged plate should be spot-faced to correspond with dimension "B."

With reference to dimension "H," the diameter of the orifice should not be greater than 60 per cent of the inside diameter of the pipe line in which the meter plate is installed. It is recommended that this should be closely followed, and if necessary to keep within this limit, a larger meter run should be installed.

Straight Edged Plates: The straight edged plate, while somewhat similar to the aforementioned plate, does not possess the characteristic of the bevel. Fig. 2 shows its design. It will be seen that this type of plate is readily adaptable to reverse flow of gas provided, of course, that the quantities measured are within the maximum and minimum limits of the capacity of the orifice. One advantage where this plate is used is that there is no possibility of installing the plate backwards, and time is saved when it becomes necessary to measure gas in a reverse direction. When remodeling of the plate is undertaken for a larger size of orifice due to its becoming damaged, or to the need for a larger orifice, little time and expense are involved.

This style orifice plate is becoming well recognized among meter men and it is the recommendation of the Standards Committee that this type of plate be adopted as standard equipment for the securing of differential pressures when measuring gas and liquid by orifice meters.

The dimension "A" in Figs. 1, 2 and 3, is of such a size that when a plate is resting on the bottom half of the bolt of the flange, it will permit the orifice to be concentric to the inside of the meter pipe. While some tests have been made where eccentric orifices have been used in meters where the pressure taps are taken 2½ and 8 diameters, it cannot be said that any serious effects result from a plate in use in such a position. However, as a measure of safety, the plate should be placed in the meter run for line connections as near center as possible. Where the pressure connections are taken off at the flange, it is essential that the plate be accurately centered, as an error of serious nature will be experienced.

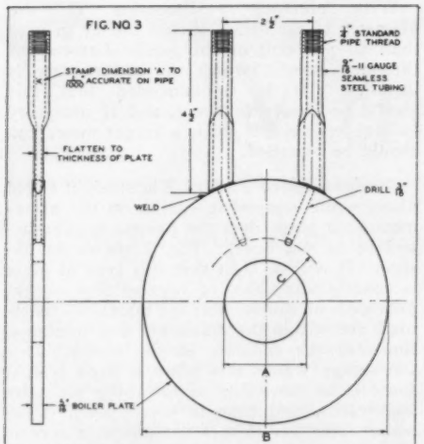
"B" is counter-bored to a depth to allow "G," or the face of the orifice, to be of the recommended ⅛-inch width. The diameter of the cut is made to correspond with the nominal inside diameter of the pipe in which the plate is to be used.

Self-Contained Orifice Meter Plate: The plate, as described in Fig. 3, consists of a piece of steel boiler plate, or other suitable material, of ⅜-inch thickness, machined to the correct outside diameter. Reference is made to the accompanying table. From the outside edge two 3/16-inch holes are drilled towards the center of the plate or in the direction of the orifice. The distance of these holes for various size plates are recommended as follows:

This distance is 1/16 inch less than ½ of the nominal pipe size for 2-inch pipe; ⅛ inch less than ½ the nominal pipe size for 2½-inch and 3-inch pipe; ¼ inch less than ½ the nominal pipe size for 4-inch pipe; ½ inch less than ½ the nominal pipe size for 6-inch pipe; ¾ inch less than ½ the nominal pipe size for 8-inch pipe; 1 inch less than ½ the nominal pipe size of 10-inch pipe; and 1½ inches less than ½ the nominal size for 12-inch pipe. This distance gets the connection out toward the inner surface of the pipe into a zone of inactive flow.

One of the 3/16-inch holes drilled from the outer edge is connected on one side of the plate and the other to the opposite side. Two nipples of ¼-inch pipe of suitable length are welded onto the edge of the plate

FIG. NO. 3



STANDARD SELF CONTAINED ORIFICE METER PLATES

PIPE NOMINAL	SIZE I.D. OF STD. PIPE	A FOR FULL SIZED ORIFICE	B FOR STD FLGS.	B FOR E.H. FLGS.	C FROM CENTER
2"	2.07"	1.50"	4 1/8"	4 3/4"	1 1/16"
2 1/2	2.47	1.875	4 3/4	5 1/8	1 1/8
3	3.07	2.25	5 3/8	5 1/8	1 3/8
4	4.03	3.00	6 7/8	7 1/8	1 3/4
6	6.07	4.50	8 3/4	9 1/8	2 1/2
8	8.07	6.00	11	12 1/8	3 1/4
10	10.19	7.50	13 3/4	14 1/4	4
12	12.09	9.00	16 1/4	18 3/8	4 1/2

over the holes drilled. These serve as gauge line connections.

It has been found that in comparison of differentials created with the use of the self-contained plate as against that of the standard plate, the results obtained checked very closely for most orifice ratios. These plates have become very useful in the measurement of oil, water, gas, air and steam, and can be accepted to be within 2 per cent or closer where ratios of orifices to pipe diameter are not in excess of .6 when using the (C) factors, as given by Foxboro or Westcott for flange connections. It is thought that the (C) factors could be developed for this particular design of plate, and if so done, their application would be as accurate and reliable, and even more useful and convenient than many orifice plates now in use.

Handles on Orifice Meter Plates: The handles on the orifice meter plates "E" can be attached in a satisfactory and secure manner with the use of the oxygen-acetylene welding or electric arc welding equipment. It has been found that the latter method offers the maximum of protection to the orifice in that no concentration of heat is maintained, thus insuring against the possibility of the orifice becoming warped or changed from its true roundness in shape. In using the oxygen-acetylene method, it has been found that by placing the plate in a bucket of water or wet sand there is little possibility for any distortion of the orifice.

Handles may be attached to the plate by means of the dove-tailed method. This has been found satisfactory if care is taken to see that they are properly and securely attached.

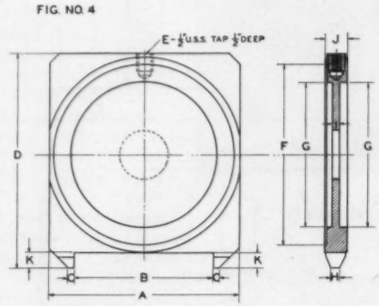
All handles should be stamped to show the size of orifice and other useful identification information. A code or serial number is recommended as a means of identifying individual plates. On the bevel edged plates, the orifice size should always be placed on one particular side of the handle, preferably on the outlet side. This affords the means of assuring with certainty the correct position of the plate.

Handles may be attached to the plates before the orifice has been machined. This allows the making of an accurate orifice, but it has been found where it is a large plate, say of 20-inch size, some difficulty might be experienced in placing the plate in a machinist's lathe for its finishing. All drawings have been made to show the handles long enough for the necessary markings.

Robinson Orifice Meter Plates: The Robinson orifice plate used in a special meter fitting is constructed from 5/8-inch tank steel and has its corners clipped, as shown in Fig. 4, which materially helps in keeping the plate from binding, as it is slipped through the fitting into place under pressure.

Another worth while item is that the bottom edge of the plate is recessed about 3/8 of an inch, which with the bottom corner rounded off causing a tapered pair of legs, is all that is necessary to effect a solid seat against the bottom of the casting flange. Thus, if any dirt or grit accumulates in the plate groove at the bottom, all of the plate does not have to be firmly seated, but the two feet will only have to push the grit and dirt to one side and in this manner assure a secure seat in the same elevation at all times. The plate, being installed, can be locked into a permanent position by set-screws located in the fitting. This also insures against the wiggling of the plate in cases where there is a pulsation or surging of gases or liquids in the line. Gaskets and

FIG. NO. 4



STANDARD ROBINSON ORIFICE FITTING PLATES

SIZE INCHES	A	B	C	D	E	F	G	H	I	J	K
2	3 1/8	2	1/4	4	1/4-13 U.S.S.	2 5/16	2.067	1/4	1/8	19/32	3/8
3	4 5/16	3	"	5	"	3 5/16	3.068	"	"	"	"
4	5 1/16	3 3/4	"	6	"	4 5/16	4.026	"	"	"	"
6	7 1/16	5	"	8	"	6 5/16	6.065	"	"	"	"
8	9 1/16	6 1/2	"	10 1/4	"	8 5/16	8.071	"	"	"	"
10	11 1/16	8 1/2	"	12 1/4	"	11 1/4	10.192	"	"	"	"
12	13 1/16	10	"	14 1/4	"	13	12.000	"	"	"	"
14	15 1/16	12	"	16	"	14 1/4	13.250	"	"	"	"
16	17 1/16	13 1/2	"	18 1/4	"	16 1/4	15.250	"	"	"	"
18	20 1/16	16 1/4	"	20 1/4	"	18 1/4	17.182	"	"	"	"
20	22 1/16	17 3/4	"	22 1/4	"	20 1/4	19.182	"	"	"	"

gasket grooves also provide for making an absolutely tight joint against the casting wall. This is done with the assistance of the set-screws above described.

Accuracy of Orifice Meter Plates: In the manufacturing and making of orifice meter plates, extreme care should be taken so as to leave the orifice edge and face as absolutely free from any imperfections and burrs as possible. The results of lathe chattering should be avoided. The diameter of the orifice should be machined and limited not to exceed the allowable tolerance of .001 of an inch. Plug gauges or inside micrometers should be used in all cases to check the actual inside diameter of the machined surface. Final machining of the upstream edge of the orifice should be left sharp and square. This is not a passing remark, but one of great importance and should be rigidly insisted upon. Experimental investigations have revealed that when an orifice is used for the measurement of gas, where the upstream edge is rounded, it will result in the measurement being lower than the true quantity. If the upstream edge of the orifice contains a fin or wire edge extending into the orifice, it will produce inaccuracies in the measurements either in a higher or lower direction. These imperfections can be removed in a satisfactory manner by honing. Touching up the face of the orifice or edges with a file or a scraping tool or other metallic instruments is considered bad practice; likewise the use of sandpaper or emery cloth should in all cases be avoided.

Warped plates will impair the true measurements, and the results will be either a high or low reading from the actual quantity passing through the orifice. The surfacing of orifice meter plates should be as smooth as possible. This minimizes the chance of the adherence of dirt or other substance on the face of the orifice or side of the plate. When a new plate is received, caution should be taken to check all dimensions. It is good practice to institute plate inspections at regular intervals. This should be performed at least once a month, especially in cases where the same orifice plate is apt to be in use for any great length of time, and when being done the application of inside micrometer readings, condition of the plate with reference to its cleanliness, mechanical appearance, and other observations should be noted. If any great deviation from a perfect condition results, the plate in question should be removed and replaced with one that has been previously checked and found to meet the necessary requirements. Plates found to be inaccurate should be gone over mechanically and not put in stock until their perfection is certain.

Materials Used in Making Orifice Plates: The materials used in the making of orifice plates are usually mild steel boiler plate, case hardened or tempered steel, or soft iron coated with German silver, chromium, or nickel plating. Some plates have also been made of bronze and monel metals in an attempt to totally prevent corrosion. The use of these materials is due to various theories as to the action of the gas on the orifice disc; the non-corrosive plating or coating is used on the theory that the principal danger is from change in area of the orifice plate by corrosion. The use of steel and other hard metals is based on the theory that the danger is from a change in area from a scouring or sand-blasting of the hole caused by a velocity or action of gas in passing through the disc. The mild steel plate or boiler plate is used on the assumption that neither of the two effects mentioned above is a source of serious trouble, but that the important thing is to be able to machine the orifice to above mentioned micrometer dimension so that the capacity can be determined by measurement of the orifice and a predetermined coefficient and without individual calibrations for each plate.

It seems logical to assume that the ordinary soft boiler plate is practical enough for most purposes, and for instances where high corrosive action is evident, if the plate is made from monel metal, it will suffice to offset this tendency.

Gaskets Used With Orifice Meter Plates: In using the plates shown in Figs. 1, 2 and 3, gaskets are necessary to insure a tight connection when the plate is bolted in place between the flanges. Ordinary asbestos stock or a material containing graphite of 1/32-inch or 1/16-inch thickness may be used

with satisfactory results. In locating the gaskets, a preparation of white lead, graphite, heavy oil or cup grease has been found to be a good means of cementing the gasket in place against the plate. A coating of grease can be used between the gasket and the flanges if desired. Shellac should never be used, as it causes sticking and the gasket invariably becomes torn when removing the orifice disc. Shellacing prohibits the use of gaskets more than once. Caution should be taken when cutting the gaskets to see that no part of the inside circle of the material should extend into the pipe line.

The following table gives correct measurements for cutting gaskets used with the various sizes of meter plates:

STANDARD FLANGES			EXTRA HEAVY FLANGES		
Pipe Size	Outside Diam.	Inside Diam.	Pipe Size	Outside Diam.	Inside Diam.
2 in.	4⅛ in.	2 in.	2 in.	4⅜ in.	2 in.
3 in.	5⅜ in.	3 in.	3 in.	5⅞ in.	3 in.
4 in.	6⅞ in.	4 in.	4 in.	7⅛ in.	4 in.
6 in.	8¾ in.	6 in.	6 in.	9⅞ in.	6 in.
8 in.	11 in.	8 in.	8 in.	12⅛ in.	8 in.
10 in.	13⅜ in.	10 in.	10 in.	14¼ in.	10 in.
12 in.	16⅛ in.	12 in.	12 in.	16⅝ in.	12 in.
16 in.	20¼ in.	15¼ in.	16 in.	21¼ in.	15¼ in.

It has been found by experience that the use of gaskets with Robinson orifice meter plates is not entirely necessary, and if the plate is reversed so that the ground surface is placed against the face of the fitting, the same results will be maintained. This has a great advantage where plates for large meters are used. Dirt accumulated on the orifice plate on the upstream edge causes an error in measurement, as tests have shown, and orifice plates should be kept as clean as possible from all such accumulation. The great danger of allowing the dirt to build up on the sides of the plate, is that if the dirt is moist or sticky, it will eventually build up sufficient dirt to taper off the walls of the pipe and cause a funnel effect, which will choke off flange fitting taps altogether and cause increased velocity through the orifice and past the 2½ and 8-inch diameter connections.

The Ranarex Gas Density Recorder

By U. A. Hammett

*The Permutit Company**

THAT the density of gas has considerable influence on the satisfactory operation of appliances has been shown by research work made by the American Gas Association under the supervision of R. H. Conner, director of the Testing Laboratory. However, the density not only has an effect on the operation of gas appliances, but it also has an effect on the accuracy of gas meters when other than displacement type meters are used.

Before gas was used as a fuel by industries the question of accurately metering large quantities of gas was not so important. However, this has changed, and in order to insure the consumer as well as the producer that the bills rendered cover the amount of gas actually consumed, very accurate metering of large gas quantities has become necessary.

When the orifice type of meter is used, the gas density must be determined in order to find the correct orifice coefficient. This is sometimes done by means of the effusometer. However, this method was found to give very erratic results, as determined by J. D. Edwards. The conclusion reached by Mr. Edwards was that with a given gas it is possible to obtain an accuracy of about 2 per cent if the effusometer is calibrated and its correction factors are determined. However, these correction factors have to be determined for every type of gas to be tested, and with a given effusometer they will vary considerably for different types of gases. These precautions are rarely taken in practice so that much larger errors than 2 per cent are frequently to be dealt with.

The Edwards gas density balance gives very accurate results, but this apparatus, like the Schilling effusometer, is manually operated; therefore, it is impossible to obtain a continuous density record from either of these devices.

With the Raranex gas density recorder a continuous record of the density is obtained. This enables the operator to determine the correction factor to be applied to the meter, as the average density over a period of a day, a week, or even longer, may be obtained from the chart record.

The operating parts of the Ranarex density recorder are shown in Fig. 1. In order to obtain a substantial force as a means of measuring the specific gravity of the gas, a rotating motion is imparted to the gas by means of a motor-driven fan running in a chamber. This fan drives the gas against the blades of an impulse wheel located opposite the fan in the same chamber and thus produces a torque on the shaft of that impulse wheel, this torque being proportional to the specific gravity of the gas.

To eliminate the influence of changes in fan speed, temperature, humidity and atmospheric pressure a comparing torque is produced on another impulse wheel by air to which a rotating motion is imparted in a second chamber by means of a second fan driven by the same motor. This fan, however, rotates in the opposite direction to the gas fan.

The two impulse wheel shafts are coupled together by means of two levers and a connecting link. This coupling system prevents complete rotation of the impulse wheels, but the difference in the two opposing torques causes a limited movement of the system which is transmitted to a pointer designating the figures on the scale calibrated in terms of density (air = 1). At the same time a clear record of the results is made

* Presented before the Southern California Meter Association, October 24, 1929.

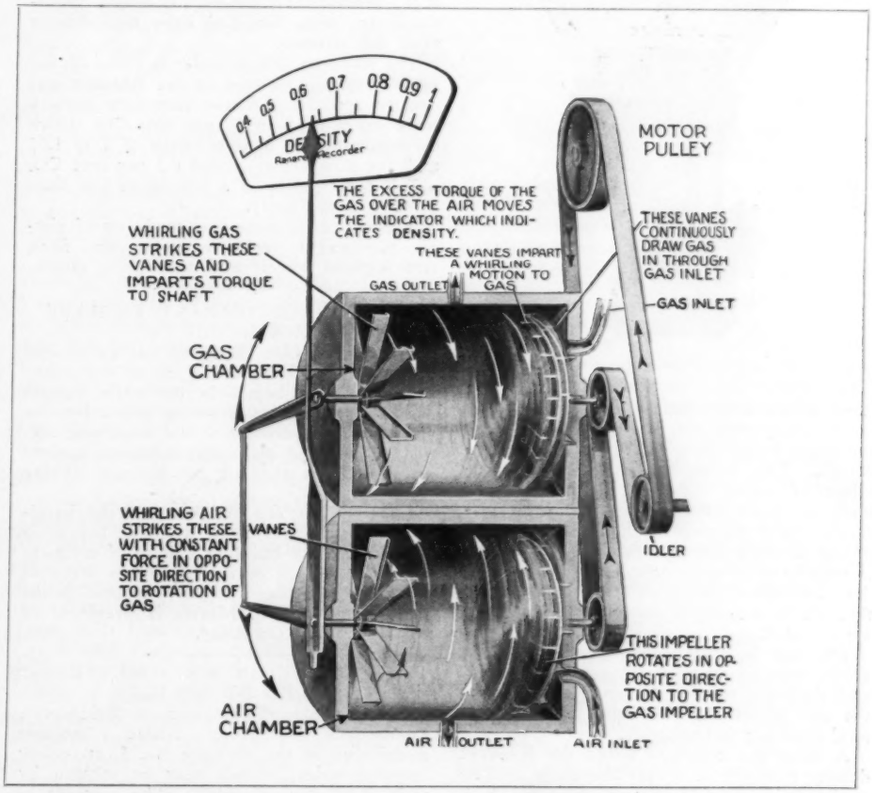

0.4 0.5 0.6 0.7 0.8 0.9 1
DENSITY
Ranarex Recorder
THE EXCESS TORQUE OF THE GAS OVER THE AIR MOVES THE INDICATOR WHICH INDICATES DENSITY.
MOTOR PULLEY
THESE VANES CONTINUOUSLY DRAW GAS IN THROUGH GAS INLET
WHIRLING GAS STRIKES THESE VANES AND IMPARTS TORQUE TO SHAFT
THESE VANES IMPART A WHIRLING MOTION TO GAS
GAS OUTLET
GAS INLET
GAS CHAMBER
WHIRLING AIR STRIKES THESE VANES WITH CONSTANT FORCE IN OPPOSITE DIRECTION TO ROTATION OF GAS
IDLER
THIS IMPELLER ROTATES IN OPPOSITE DIRECTION TO THE GAS IMPELLER
AIR CHAMBER
AIR OUTLET
AIR INLET

Fig. 1

TABLE NO. 1.

Gas	Ranarex Density Reading	Edwards Density Determination	Difference in Density
Coal Gas	0.39	0.404	
	0.40	0.403	
	0.40	0.404	
	0.40	0.406	
Average	0.397	0.404	0.007
Mixed coal and carburetted water gas	0.44	0.44	0
	0.49	0.49	0
Carburetted water gas	0.66	0.67	
	0.65	0.645	
	0.65	0.645	
	0.65	0.64	
Average	0.652	0.650	0.002
Mixed gas and nitrogen	0.79	0.79	0
	0.88	0.88	0
	0.93	0.93	0

on a strip chart by a series of perforations, the recording device also being driven by a motor.

The gas passes first through a cotton filter and thence through one compartment of a double humidifier, where it is brought to the

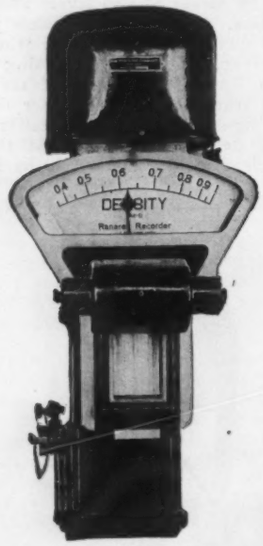


Fig. 2

same temperature and degree of humidity as the comparing air which passes through the other humidifier compartment simultaneously. The humidifier is merely a container of water with a gas-tight dividing wall, the gases passing over the water surfaces. After leaving the humidifier the gas passes through the gas chamber, whence it is exhausted to the atmosphere. The air in the meantime, is circulated continuously through its humidifier compartment and the air chamber.

The gas is drawn through the machine at the rate of about 6 cubic feet per hour, and since the reading is instantaneous after the gas enters the measuring chamber the total time lag is negligible.

A large gas company tested the Ranarex density recorder in a very thorough manner to determine its accuracy as compared with an Edwards gas density balance, and also its quickness of response to changes in density. Manufactured gases and nitrogen giving a gravity range of 0.39 to 0.93 were used in testing the machine. The results of these tests are shown in Table No. 1.

It was found that the maximum difference between any one reading of the Ranarex and the corresponding reading of the Edwards Balance was 0.014 density. However, the average error was considerably less than this. It was further found that the machine responded rapidly to changes in density and that its rugged mechanical construction made it suitable to operate under plant conditions, especially since the attendance needed is only slight and does not require high skill. Atmospheric conditions, drafts, vibrations, etc., were found to have no influence upon the accuracy.

The Ranarex CO_2 recorder is based on the same principle as used in the Ranarex gas density recorder. These recorders have a scale range of 0 to 20 per cent CO_2 which corresponds to a density range of 1 to 1.08 and are accurate to within 0.3 per cent CO_2 which corresponds to a density of less than 0.002 (0.2 per cent).

The entire instrument is made up of simple mechanical parts: a motor, two fans, two impulse wheels and a coupling system.

DALLAS GAS COMPANY TO HAVE NEW BUILDING

The Dallas Gas Company has announced plans for the construction of a new office building to be begun in the early future. Architects are now drawing plans for the structure to be erected at the southwest corner of Harwood and Jackson streets, a short distance from the present location of the company.

Exact dimensions and costs of the building have not yet been decided, but it is thought that the building will be of sufficient size to provide a part of the space needs of the Lone Star Gas Company, located in the same block. H. C. Morris is president of the Dallas Gas Company.

BOOKLET ON NO. 5 METER ISSUED BY SPRAGUE

Sprague Meter Company of Bridgeport, Connecticut, has recently issued a circular descriptive of the Sprague No. 5, recording demand meters, which may be secured by writing to the company. The circular is styled No. 13.

Many Gas Features *in* B. *of* M. Exhibit *at* Tulsa

THE Bureau of Mines, in its exhibit at the Sixth International Petroleum Exposition and Congress held at Tulsa, Okla., during the dates October 5-12, featured the safety first, the refining and the natural gas work of the Bartlesville station. The Bureau's display was housed in the Scientific Building.

Safety First: Featuring the safety first exhibit was a demonstration of the Schaeffer method of giving artificial respiration. Two robots, life size and actuated mechanically, showed the exact movements that should be used by the rescuer in applying and removing pressure on the victim to restore normal breathing. This demonstration was very realistic and created considerable attention. Numerous people were sufficiently interested to memorize the movements necessary for the correct application of artificial respiration.

During the past several years a new hazard in the oil and gas industries has been hydrogen sulphide poisoning. Hydrogen sulphide in certain concentrations is deadly. The action of the gas is to completely paralyze the respiratory organs of the body and the only way that breathing can be restored and the patient brought to life is to apply artificial respiration before it is too late. The possible effectiveness of applying artificial respiration and the care that should be taken with a patient overcome by hydrogen sulphide poisoning was demonstrated by putting white rats under the influence of the gas and then resuscitating them with artificial respiration. The rats were too small for manual respiration and the pressure had to be applied and released with air pressure.

Petroleum Pipe Still and Bubble Tower: The small pipe still and bubble tower in this exhibit were intended to give the general public an idea of how commercial products are made from crude petroleum by the most modern method. It also visualized for the plant operator how a bubble tower functioned, this functioning being the same whether the tower was used as a fractionating column in a refinery or as a stabilizer in a natural gas gasoline plant. The oil is heated while passing through a pipe still and upon reaching the evaporator partially vaporizes. These vapors are fractionated and some of them are gradually condensed as they ascend up the tower. Thus commercial products are separated at different parts in the tower, the gasoline usually coming off of the top as a vapor and the other products off of the side as liquids.

Natural Gas Exhibit: The natural gas exhibit consisted of a large chart showing the general features of a natural gas system, from wells to consumers, a tabulation of a number of problems relating to the production, transmission and distribution of natural gas, an exhibit of the possible utilization of natural gas for the manufacture of chemical products, and a demonstration of a typical experimental set-up for checking pipe line capacities.

Most people do not realize the operating difficulties and the necessary magnitude of the natural gas industry to produce, transmit and finally distribute gas to them for heating and other purposes. The chart in this exhibit explained that conservation, efficient operation and satisfactory public service necessitate the continual study of

numerous natural gas problems, and the operation of an intricate system of producing, transmitting and distributing facilities.

The problem of the most efficient utilization of natural gas is an important problem to the natural gas industry and considerable interest is being manifested in the possible utilization for the manufacture of chemical products. Three processes are being studied for the making of commercial products: chlorination, oxidation and pyrolysis or "cracking." Some of the most important products possible from these processes were shown, together with samples of the products.

The experimental set-up for checking pipe line capacities consisted of a miniature pipe line with equipment for observing pressure, volume and temperature data at the intake and discharge of the line. The pressure measuring equipment consisted of a dead weight gauge capable of an accuracy within 0.1 pounds per square inch. The volume measuring equipment consisted of a high pressure manometer for differential pressure data across the orifice plate and the dead weight gauge. The temperature was observed with a mercurial thermometer.

GAS DEPARTMENT OF B. C. ELEC. HAS BOOTH AT EXHIBITION

The gas department of the British Columbia Electric Railway Company at Vancouver, B. C., had an attractive exhibit at the Canada Pacific Exhibition at Vancouver, B. C., recently.

The booth was built along the lines of a Spanish bungalow, finished in bright California stucco, and was divided into five sections. In the section at one end was a display of ranges, gas fires, and water heaters. At the opposite end was another section devoted to a display of gas refrigerators.

The three center sections showed gas-equipped rooms. There was a typical living room with a radiant fire installed. A model gas-equipped kitchen complete with gas range, water heaters, and refrigerator, occupied the second room. The third room was called "That Extra Room," and showed the basement, which, through the use of a gas furnace, could be used for a variety of purposes.

1929-1930 Calendar

Mid-Continent Oil & Gas Association—Texas Division—San Angelo, Texas, November 8, 1929.

California Natural Gasoline Association, Annual Banquet—Biltmore Hotel, Los Angeles, Calif., November 14, 1929.

Regional Conference, Pacific Coast Gas Association—Fairmont Hotel, San Francisco, Calif., November 21-22, 1929.

Southern California Meter Association—November 21, 1929.

Ninth Annual Gas Meter Short Course—Iowa State College, Ames, Iowa, December 3-6, 1929.

Utilities Association Secretaries of the United States—Chicago, December, 1929.

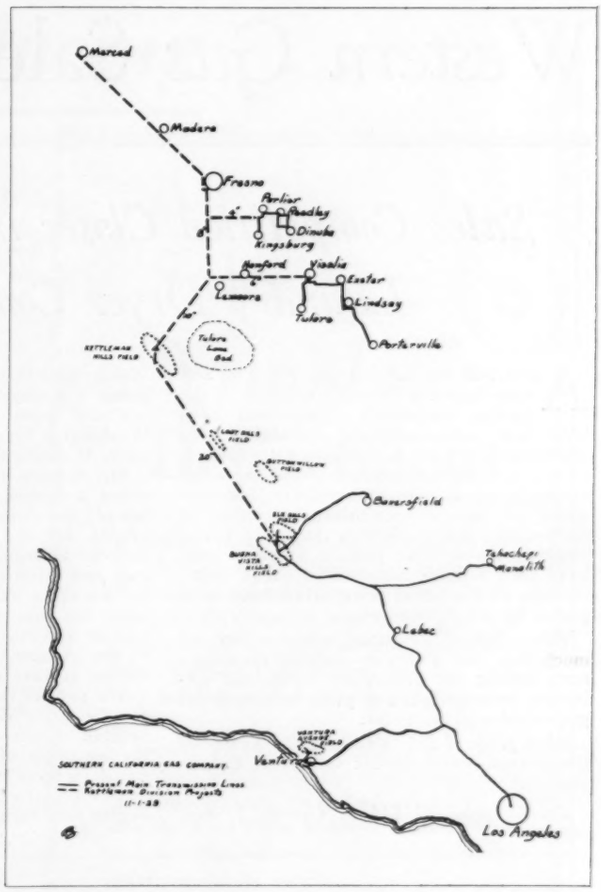
Arizona Utilities Association, Pacific Coast Gas Association—Joint conference, Arizona Biltmore, near Phoenix, April, 1930.

Mid-West Gas Association—Waterloo, Iowa, April 14-16, 1930.

So. Cal. Gas. Co. Pipe Line Program *in* San Joaquin

ON July 16 A. B. Macbeth, president of the Southern California Gas Company, announced that his company would start immediate construction of a pipe line from the Kettleman Hills oil and gas field to central San Joaquin Valley cities and communities, in order to supply them with 100 per cent natural gas service.

Construction of this system, which consists of a 10-inch pipe line from the oil field to Lemoore Junction, a 6-inch pipe line from Lemoore Junction to Visalia, an 8-inch pipe line from Lemoore to Fresno, and an 8- and 6-inch pipe line from Fresno to Merced, began the early part of August, and by October 15 was completed as far as Visalia and Fresno. Costing $1,500,000 this system will supply natural gas to central San Joaquin cities and communities heretofore served with manufactured oil gas. Hanford was the first community to receive service of straight natural gas, on October 21. Visalia was converted to straight natural gas basis on October 28. Other communities will receive straight natural gas service as soon as the necessary connections are made and the appliance adjustment crews are available.



Showing natural gas line construction in progress on San Joaquin Valley additions to Southern California Gas Company system. Map courtesy of Roy M. Bauer.

Southern California Gas Company has also contracted with the Pacific Gas and Electric Company to transport natural gas from the Kettleman Hills oil and gas fields to the city of Fresno, which is now served with manufactured gas by the P. G. and E.

In addition to supplying the present gas needs of this section of the San Joaquin Valley, gas will be available for industrial purposes. Natural gas to supply this territory will be obtained by utilizing the large volumes made available by recent development in the Kettleman Hills oil and gas fields. Long term gas contracts having been entered into with the oil producers.

To augment the supply of casing head gas in Taft and Bakersfield and vicinity, and provide an additional source of gas for Los Angeles and other Southern California cities, Mr. Macbeth on October 16 announced the awarding of contracts totaling $2,000,000 for the construction of a 20-inch natural gas pipe line from Kettleman Hills to the Buena Vista Hills terminal of the Southern California Gas Company system near Taft, a distance of 70 miles.

This transmission line, the largest in southern California, will have a capacity of 85,000,000 cubic feet of gas a day, with an initial pressure of 400 pounds.

Officials of the Southern California Gas Company stated that the work will be commenced as soon as the material arrives, and that it is to be completed during January, 1930.

In order to facilitate the operation of this 20-inch pipe line, a private telephone system will be constructed extending from the company's headquarters at Taft to the headquarters of their Kettleman Division at Avenal.

The Macco Construction Company has been awarded the general contract, exclusive of hauling and welding. The Asbury Transportation Company will unload, haul, and string the pipe, and the A. O. Smith Company will furnish the pipe and do the field welding.

To facilitate operation a new operating and accounting division known as the Kettleman Division has been established, with headquarters at Avenal. J. W. Farner, formerly superintendent of distribution of the Midway Division at Taft, is the division superintendent of the Kettleman Division.

OTTO NEISSER ILL ON TRIP TO A.G.A. CONVENTION

Otto Neisser, Southern California distributor for the Ruud Water Heater Company, upon arrival at Atlantic City for the American Gas Association's Convention, was stricken ill with appendicitis. An operation was not necessary, and Mr. Neisser has recovered from the attack.

Western Gas Salesmen's Competition

Sales Competition Closes in Spirited Laundry Dryer Contest

AROUND the subject of "How to Sell Gas Laundry Dryers," entrants in the closing Salesmen's Competition have built some enthusiastic and convincing sales arguments. These are fairly well defined, in the case of this appliance, and the same emphasis upon speed, convenience, independence of weather condition, protection of clothes, etc., was evident in the entire list of contest entries. The judge's selection must have been a shade more difficult than usual, because of this marshalling of effective sales points by all contenders.

From Clifford Johnstone, who has devoted much time and ability to judging these contests during the past year, comes the following announcement of prize honors in the gas laundry dryer event:

First prize of $25 to Claude C. Skaates of the Mumm-Romer-Jaycox Company, Columbus, Ohio.

Second prize of $15 to George J. Roe, Washington Gas and Electric Company, Tacoma, Washington.

Third prize of $10 to H. H. Fleming, Washington Gas and Electric Company, Everett, Washington.

Mr. Skaates in his winning paper has provided a concise sales manual, which if followed, we venture, will be gainful of real results for the salesman of gas laundry dryers. George J. Roe of the Washington gas and Electric Company's Tacoma office has his name on the prize list for the second time. He won second place in the oven heat control contest, results of which appeared in our August, 1929, issue, and this month he has another second place to his credit.

We publish the three winning manuscripts for the final "Western Gas Salesmen's Competition" below—and at the same time point the attention of everyone who has participated in these monthly prize contests to our "Sales Wrinkle Department," which officially begins next month.—*Contest Editor.*

"Know Your Appliance," Says Contest Winner

CLAUDE C. SKAATES

The Mumm-Romer-Jaycox Company
Columbus, Ohio

FIRST, know your appliance. Study the literature furnished by the manufacturer. Help set up a dryer and help do a washing so as to familiarize yourself with its construction and operation.

SECOND, select 10 of your washer customers, preferably those who have ironers, and mail them a dryer broadside. Two days later send them another mailing piece and follow this in a couple of days with a third piece of literature.

Claude C. Skaates
Winner, Gas Laundry Dryer Contest

THIRD. If possible, call on Mrs. Prospect the morning of her next wash-day. If it is a bad day your sale is half made. She will be somewhat provoked at the gloomy weather and in a receptive frame of mind to consider a better method of drying clothes. Tell her that with the Blank Gas Dryer she can wash, dry and iron on the same day each week. Show her the annual statistics from your own local weather bureau—convincing proof that half the wash-days are inclement. Tell her that unless she has a Blank Gas Dryer half of her wash-days must be delayed—or the clothes dried in a makeshift manner.

Emphasize the point that one tubful of clothes dries while the next is being washed and wrung—that she, or her laundress can start ironing without needless delay. Explain the indirect heating system, thermostatic temperature control, low gas consumption of approximately 1200 cubic feet per month and the small amount of floor space required. Point out that her clothes will be protected from dust, soot, showers, whipping winds, sagging or broken lines and the curious gaze of neighbors. Explain the Gas Company's convenient payment plan and then ask her if it will be convenient to make the installation—say Thursday morning.

Second Prize Entry

GEORGE J. ROE

Washington Gas and Electric Company
Tacoma, Washington

"MADAM, have you ever stopped to consider that even though you have a washing machine and an ironer, without this gas laundry dryer you are still dependent on the weather? How many times have your plans been all upset because of rain or snow? And consider the dust and soot that are often so trying on your nerves.

"The weather is wash-day's biggest problem. Why not solve this problem—be independent of the weather and absolutely assured of clean, dry, sweet-smelling clothes every wash-day in a life-time, by installing one of our gas laundry dryers? Eliminate the labor of carrying heavy baskets of wet clothes. Do away with injurious stretching, straining and reaching for clothes lines. The gas laundry dryer is the connecting link in the labor saving chain of laundry appliances. It eliminates the extra drudgery and needless waiting for clothes to dry and above all, it assures you of cleaner, better looking, more sanitary washings, for it's always fair weather with the gas laundry dryer.

"Warm, sterile air dries the clothes quickly and leaves them as white and clean-smelling as when dried out of doors on a hot summer's day. A perfect system of ventilation circulates warm, dry air about the clothes in a thorough and rapid manner. There is no fear of any discoloration of clothes, clothes-pin tears or clothesline marks.

"When you consider all these advantages, Madam, and the many others you no doubt can picture, I am certain that you will wonder why you have waited so long before having one installed."

Third Prize Entry

H. H. FLEMING

Washington Gas and Electric Company
Everett, Washington

"JUST imagine Mrs. Prospect, no more carrying of heavy baskets outside in the windy days—no broken clothes lines—no soot or smoke—no waiting for rainless days to hang out your laundry. These are just a few of the things that the gas heated laundry drier will eliminate for you.

"As you know, bleaching is merely warm air absorbing the moisture from the clothes—the warmer the air the whiter the clothes. With the drier, the clothes are dried, bleached and sterilized in thirty minutes, saving you many hours of hard work. The clothes which are hung on stainless rods come in contact with only clean hot air as the burners are carefully concealed in pipes, and it is impossible for any products of combustion to enter the drying chamber. The drier is automatically controlled so that you will never scorch your clothes no matter how long they are left in the drier. Not only is this appliance used for laundry purposes, but can be utilized to kill moths or moth eggs in any garment. When coming in out of the rain, your fur coat and the children's outer garments can be dried in a few minutes, instead of leaving them over the backs of chairs to dry.

"These many benefits are all yours Mrs. Prospect for a very small initial cost and a few cents a week to operate."

A Chance to Cash in on Ideas

EVERYTHING is set for the official opening of *Western Gas'* Sales Wrinkle Department in next month's issue. During the past eight months scores of salesmen and others closely identified with the promotion of gas appliance merchandising have taken part in the *Western Gas* contests, which have hinged about the sale of various appliances. The result, we are certain from the universal reception these contests have met from sales executives and participants, has been that much purposeful thought has been put into sales technique. Through the contest department, now closed, gas appliance salesmen have informed themselves on the sales points which will serve them most effectively for each of the appliances treated.

Now, launching the Sales Wrinkle Department, we go a step further in spreading information on good sales practices. By paying $10 for each acceptable wrinkle we hope to bring to light a host of sales ideas which have worked out in practice—useful adjuncts to sales campaigns, points in sales approach and closing, "freak" or stunt campaigns, advertising novelties which have produced—our Sales Wrinkle department is wide open for ideas. They may come from anyone within the gas industry, in unlimited number, and may treat any phase of sales promotion, no matter how minor.

Watch for the Sales Wrinkles, starting in the December issue of *Western Gas*.

TEXAS CITIES SALES SUPERVISOR WEARS 10-GALLON HEAD COVER

Geo. L. Thernes

WHEN Geo. L. Thernes was transferred from the gas company at Council Bluffs, Iowa, to the Texas Cities Gas Company office at Waco, Texas, as sales supervisor for the company, he found some sales conditions which came as more or less of a surprise, according to C. V. Allin, manager of the company. Prominent among these was the formal request that he should wear a hat while on duty. Whereupon Mr. Thernes procured for himself a life-sized edition of the typical Texas John B. Stetson, 5X Clear Beaver, which sells for $60 and is of the 10-gallon variety—$6 a gallon being considered not at all out of the way for this type of sales promotion. The accompanying photo shows Mr. Thernes in the "big cover" which he wears while calling on his trade.

A. L. MARTIN TO MANAGE WYOMING PROPERTIES

C. M. Brewer, vice-president and general manager of Mountain States Power Company and The California Oregon Power Company, has announced the appointment of A. L. Martin as district manager of the Western Wyoming properties of Mountain States Power Company. This position places Mr. Martin in charge of eight communities with headquarters in the city of Thermopolis.

Introducing . . .

A Sales Wrinkle Department

WHAT ARE SALES WRINKLES?

YOU see them on
Every hand . . . these ideas
That sell gas
Appliances . . . now for
Instance
There's the sales
Manager who sold
Gas heating to a hotel
By using unit furnaces
For each room . . . with
A manual control
Board back
Of the hotel desk!
WHILE another man of
Sales sense insists
That rainy days are
Best for selling
Laundry dryers!
AND again . . . bow to
The gas advertising
Man who wrote
A booklet around
The simple theme of
Taking a bath . . . used
It as a premium for
Water heater sales.
When salesmen delivered
It . . . fluttered the
Leaves for the house-
Wife's attention . . . they
Made more sales than
When it was
Simply mailed out and
Followed up later!
THESE are sales
Wrinkles and we know
That YOU have
Better ones . . . They
Are worth ten dollars
Apiece if published
In WESTERN GAS . . . so
Send them
Along . . . AND NOW!

IDEAS that sell merchandise—whether it's spaghetti or spats—are worth money. *Western Gas* has decided to PAY money for ideas that sell gas appliances. Next month opens our Sales Wrinkle Department, and for each idea published therein we pay the sum of $10.

Anyone in the gas industry may submit "sales wrinkles." Let these come from your own experience or invention . . . or pass them on from another source. The *idea* is what we want . . . no questions asked as to its origin.

We aren't looking for elegant English. Write up your idea briefly, yet include the details that will help another salesman or sales department to apply it.

And keep in mind that November 20 is the deadline for December "sales wrinkles."

WESTERN GAS SALES WRINKLE DEP'T.

Care of Western Gas, 124 West Fourth Street, Los Angeles, California

HAVRE NATURAL GAS CO. HOLDS COOKING DEMONSTRATIONS

Cooking demonstrations were held on October 7 and 8, at Havre, Montana, sponsored by the Havre Natural Gas Company. Mrs. M. Lyles of St. Paul, Minnesota, conducted the school, giving practical demonstrations on whole-meal cooking. Similar schools were held in Chinook and Conrad.

UTAH WOMAN WINS TWO GAS RANGES IN 25 YEARS

Mrs. Mary Clark Olsen of Ogden, Utah, recently won a new gas range, valued at $117, in a cake-baking contest. This is the second range that Mrs. Clark has won in 25 years, the first being received as a prize when Mrs. Olsen was a girl of 12 living in Richfield, Utah.

TAY HOLBROOK, INC., NO. CALIF. DISTRIBUTOR FOR FURNACES

Tay Holbrook, Inc., has recently been appointed exclusive wholesale distributor for Northern California of the "Sav-Yur-Gas" furnace line, manufactured by the Anderson Gas Appliance Company of Portland, Oregon. This company's products include various sizes of warm air furnaces and space heaters.

HUTCHINSON, KANSAS, SCHOOLS TO USE GAS AS FUEL

Public schools of Hutchinson, Kansas, have signed a three-year contract with Bert M. Grall, manager of the Hutchinson Gas Company, for the use of gas. Last year gas was used in only one of the schools in the system.

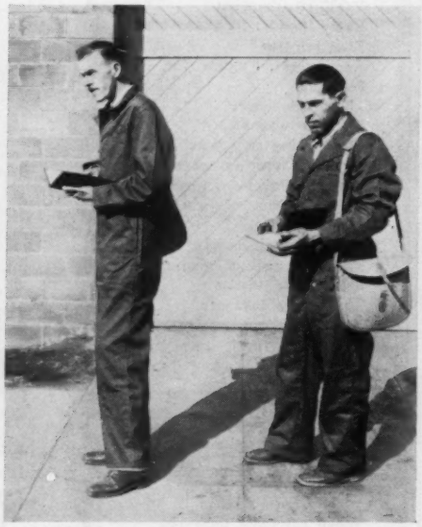
P. G. *and* E. Effects No. California Change-Over

IN effecting the change-over from manufactured gas to natural gas in that part of its territory which is to be served immediately with the unprocessed fuel, through the first transmission line from Kettleman Hills, notably in San Mateo, Santa Clara and Southern Alameda Counties, the Pacific Gas and Electric Company has evolved a complete new working department to carry on this program. Five hundred men were employed and trained over a period of two months prior to their going out on this work and they now constitute what is known as the "gas utilization crew."

The change-over started September 24 and it was anticipated that all of the 50,000 customers affected in this territory would be burning straight natural gas in properly adjusted appliances before the first of November.

Full page advertisements in all the newspapers carried the caption, "Important Message to P. G and E. Consumers About the Use of Natural Gas." Consumers were here given very detailed instructions about their appliances, advised which adjustments they could make pending the arrival of the company's utilization men. Also specifically mentioned were the various articles of automatic equipment that should not be used until they had been adjusted. Consumers were advised, "if you must use these appliances before our regular gas utilization man reaches you, please phone your regular agency or our local office."

The utilization crews have been divided under crew managers, workmen are dressed in khaki uniforms bearing the name "Pacific Gas and Electric Company" for identification. Their progress is followed by a truck which carries all the necessary orifice and other parts to be installed on the old equipment.



Khaki coveralls, with which the P. G. and E. gas utilization crews have been outfitted, have earned for these workers the name of "The Brown Rabbits." Note the handy tool kit carried by each operator.

On the day before the arrival of the workmen every householder is informed in advance of his call by a special mailing piece with the date of the call stamped on it. For the benefit of the new business department every appliance adjuster fills out a card answering detailed questions as to the gas equipment already in use in the house. This file, when completed, will form a most valuable adjunct to future sales activities.

Although work has not yet started on another phase of the change-over, the Pacific Gas & Electric Company has announced that effective November 1 or thereabouts, a 700 B.t.u. mixed natural gas will be served in the San Francisco Bay area. This area has been receiving reformed gas of 585 B.t.u. If this plan is carried through, the same method of procedure will be followed in servicing appliances in this district to make the necessary adjustments to burners and mixers. Later on, when straight natural gas is brought in, upon completion of the second line, still further adjustments will be necessary.

The Pacific Gas and Electric Company has not stopped its activity with the opening announcement that the new fuel is now available, but has been following it up with newspaper display space advocating gas for heating purposes. This, coupled with the present activities of the Sales Department, is resulting in a great number of inquiries, and salesmen are following them up and closing many contracts.

Gas rates reduced
for
house heating
All customers in San Francisco and East Bay Cities to be served a new gas fuel 27 per cent richer in heat content. There will be special low rates for house heating.
NOW there is a lower rate offered for gas fuel used in gas fired heating equipment.
This cheaper rate is in addition to the richer fuel, mixed-natural gas, that will be served about November 1st.
Average savings of 45%
The new, special heating rate is 56c per 1000 cubic feet, plus a small service charge, for the mixed-natural gas which is 27% richer in heating value than the present manufactured gas. This would be the equivalent of offering the present manufactured gas at 47c. The average rate for the manufactured gas when used for heating, was 85c.
Natural Gas soon
Straight-natural gas will be served in the spring of next year, upon the completion of the second pipe line from the gas fields. Natural gas has two times as much heating value as the present manufactured gas. The rates for natural gas in terms of heat units, will be lower even than the rate of 56c now offered for mixed gas.
Gas-fired heating ideal
And the immediate slash in price alone is not the whole story. For gas-fired heating, in addition to its low cost, is the most convenient, the most care-free and the cleanest type of heating.
Large Building and Apartment House Owners to Benefit Also
Apartment house and large building owners who use gas fuel in central plants for the purpose of heating their building, heating water or both are offered large savings.
Apply for rate now
There are already in this area 25,298 P G and E customers using gas fuel for heating their entire homes.
Those customers desiring the new rate, should apply at our local office. Or telephone and we'll send a representative. The rates will be granted upon request.
Gas is cheaper—You can use more of it.
PACIFIC GAS AND ELECTRIC COMPANY
P · G · and E ·
Owned, Operated and Managed by Californians
MNG 1

A sample of the advertising which is part of the Pacific Gas and Electric Company's sales ammunition in its drive to increase natural gas utilization.

UNION PUBLIC SERVICE COMPANY GETS KANSAS FRANCHISE

The Public Service Commission of Kansas late in September issued certificates of authorization granting to the Union Public Service Company permission to supply gas in the following towns in Kansas: Downs, Smith Center, Luray, Glen Elder, Mankato, Hiawatha, Horton, Osborne, Beloit, Ellsworth, Kanapolis, Tipton, Stockton, Agra, Woodston, Hunter, Barnard, Lucas, Simpson, Cawker City, Formosa, Jewell City, Burr Oak, Phillipsburg, Lebanon, Sabetha, Beverly, Kensington, Holyrood and Esbon.

Permission was also granted the Kansas Pipe Line and Gas Company to supply gas in the following towns: Waterville, Seneca, Hanover, Marysville, Beattie, Axtell, Blue Rapids, Frankfort, Washington and Wamego.

WORLD ENGINEERING CONGRESS TO BE HELD IN TOKYO, JAPAN

A world engineering Congress is to be held at Tokyo, Japan, from October 30 to November 20, 1929. The Kogakki, engineering society of Japan, is sponsoring the congress, and has invited the participation of governmental officials throughout the world, of universities, institutes, associations and individuals.

The Congress proposes to discuss various engineering subjects with the purpose of furthering international cooperation in the study of engineering science and problems. Baron K. Furuichi is president of the Kogakki.

WESTERN NATURAL GAS CO. NEW IN FIELD

Press reports announce the formation of the Western Natural Gas Company under the laws of Delaware for the purpose of bringing natural gas to Omaha. Thomas R. Weymouth of Tulsa, Oklahoma, is president of the corporation, the report states. The new company is controlled by the American Natural Gas Corporation, a Tri-Utilities Corporation subsidiary controlled by G. L. Ohrstrom & Company.

WESTERN DISTRIBUTING COMPANY WANTS TO INCREASE RATES

Western Distributing Company has asked the Public Service Commission of Kansas for permission to increase its gas rates in 21 cities in Kansas. Towns included in the application are Belle Plaine, Bentley, Cambridge, Derby, Douglass, Atlanta, Benton, Burdon, Halstead, El Dorado, Burrton, Mulvane, New Salem, Oxford, Sedgwick, Valley Center, Rose Hill, Mt. Hope, Towanda, and Udall. Hearing on the application was opened early in October.

EIGHT AIR-CRAFT PLANTS IN WICHITA USING NATURAL

The eighth aircraft plant was added to the list of industrial gas customers at Wichita, Kansas, early in October, when contract was made with the Buckley Aircraft company to use natural gas at the plant now building. Plants already on the lines are Travelair, Universal, Braley, Swift, Cessana, Swallow and Stearman.

SO. CAL. GAS CO. GETS PERMIT IN CENTRAL CALIFORNIA COUNTIES

The Railroad Commission of California has granted permission to the Southern California Gas Company, with headquarters in Los Angeles, to construct and operate a gas transmission system in the counties of Merced and Madera, California.

Record Attendance *for* Petroleum Congress

OIL men from every oil producing state in the Union and delegates from 18 nations brought the attendance at the Sixth Annual International Petroleum Exposition and Congress held at Tulsa, October 5 to 12, to a new high mark. Turnstiles registered a higher total of visitors to the Congress than ever before with the accompanying gate receipts. There was also a record number of exhibits.

The convention program included many special features which caused every session to be well attended, and the educational value to be unparalleled by former meetings. Many speakers of international fame were present at the Exposition. Among these was Rober Babson, who spoke at the Chamber of Commerce-Exposition luncheon, and Homer S. Fox, United States Board of Trade representative at London, England, who addressed the Mid-Continent Oil and Gas Association at the Association's banquet.

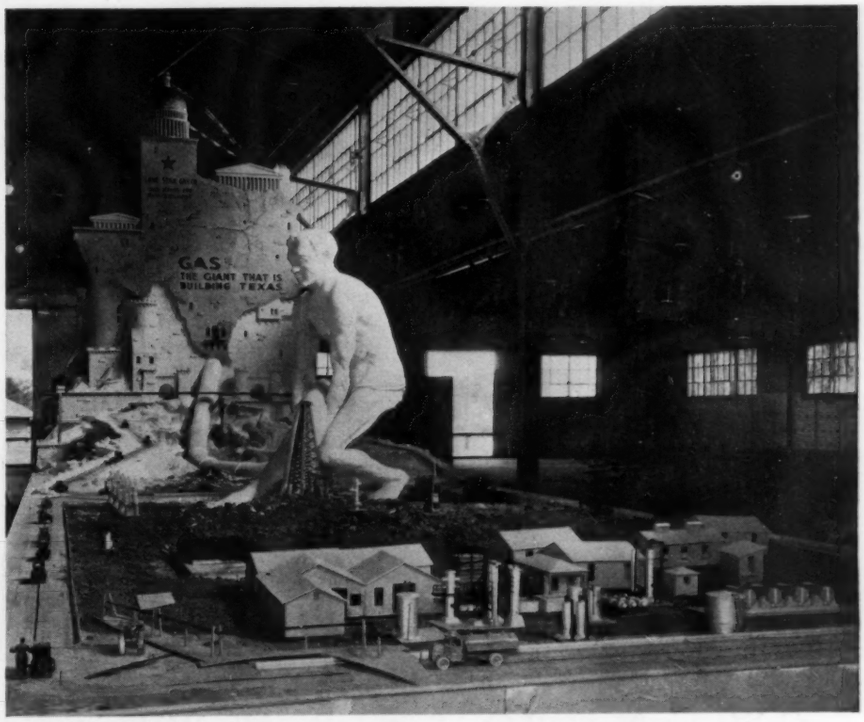
Among the contests scheduled was a pipe welding competition sponsored by the American Welding Society and several safety contests conducted by the Mid-Continent Oil and Gas Association's Safety Division of the National Safety Council.

One of the highlights of the Exposition was the aviation program which opened with an international air derby, in which only planes representing individuals of companies actively engaged in the oil business could engage. Rules also called for the starting point to be at least 500 miles from Tulsa and the entrant had to arrive at the designated line over the Exposition grounds before 6 p.m. on the opening day.

Prior to the Exposition several associations and organizations held special meetings in Tulsa. Among these were the Petroleum Division of the American Institute of Mining and Metallurgical Engineers, and the members of the Code of Ethic Committee of the American Petroleum Intsitute. A meeting of the American Association of State Geologists was held on October 8, one for the pioneers of the oil industry on October 9, at which an organization charter was drawn up, the Mid-Continent Oil and Gas Association's banquet on the night of October 9, and the meeting of the Independent Producers Association on October 10.

To the efficient staff, headed by William B. Way, manager, and to the time and effort contributed by volunteer committeemen is due much of the success of the Exposition.

Directors of the Exposition and Congress have announced definite plans to make the Seventh Annual Exposition still greater than the one of this year by increasing the space for exhibits and otherwise bettering the facilities for the show. These plans include a larger allotment of space for booths of a scientific and technical nature and changes in some instances in plant and grounds.



Lone Star Gas Company's exhibit at the Texas State Fair, held in Dallas, October 12-27, featured an allegorical representation of the many activities involved in the production of natural gas.

Natural Gas Industry Depicted *at* Texas Fair

By MARGARET MARABLE

Lone Star Gas Company

REPRODUCING in miniature the gas fields at Petrolia and a vast pipe line system, with a 12-foot symbolic bronze giant of industry, the Lone Star Gas Company offered an exhibit at the State Fair of Texas, held in Dallas October 12-27, which was a study in contrasting elements, both of which were designed to carry out one idea: the power of natural gas in development of the state.

The exhibit was an allegorical representation of the many activities involved in producing and transmitting natural gas, done in dramatic proportions, with the giant symbolizing the network of pipe lines over the state. About his feet were numerous processes incident to drilling for gas, the construction of long gas pipe lines, the operation of compressor stations, and similar undertakings. The gas main held in his hands ran from the gas field up to a map of Texas on which was illuminated the company's system.

Evolving from a skeleton of wired gas pipes, the colossal central figure slowly took shape under the direction of J. A. Poteet, designer of the exhibit. Towering 13 feet above the head of the giant was a replica of the state capitol at Austin, skillfully blended with a map of Texas, 12 feet from tip to tip, and combined with Anglo-Saxon fortresses to compose a castle topped with scarlet turrets.

On the walls of the castle, tiny animated figures, six inches high, busied themselves at various tasks. These pygmies were of five different types: the laborer, the skilled mechanic, the unskilled worker, the country dweller, and the technical man represented by 10 of each kind. Cast in glue molds, the figures were assembled and dressed by hand under the direction of the designer, and his assistant, C. D. Pruitt.

Loaded with materials and appliances pertaining to the gas industry, miniature trucks ran up to the castle on a wide track and continued their course in a double circuit around the base of the statue.

Immediately at the rear of the large exhibit was a display of gas appliances, including steel drums of compressed natural gas for use in rural and suburban homes.

WILLARD WIEGEL PRESIDENT OF B. T. UTOPIAN CLUB

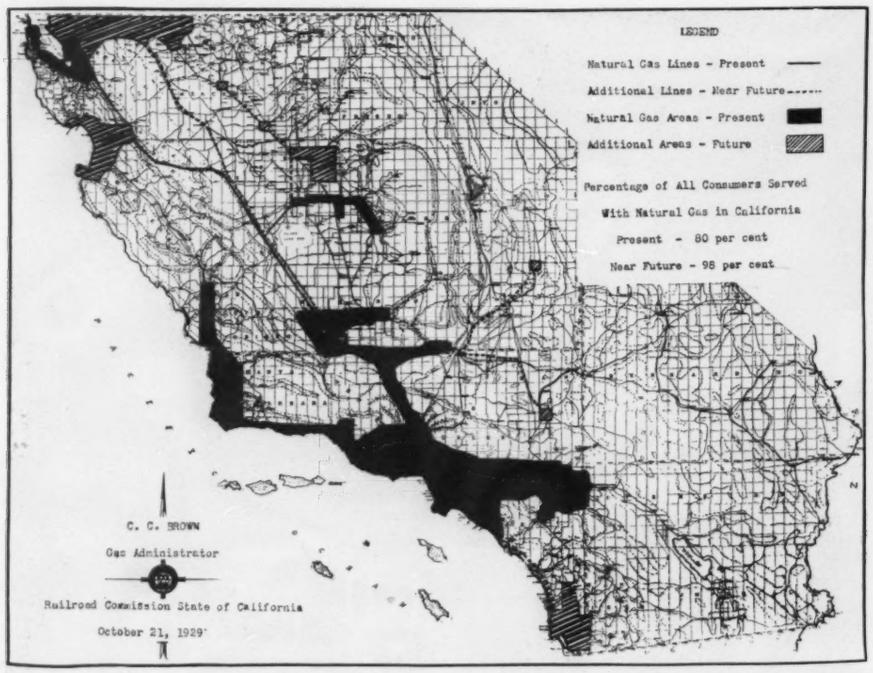
Willard G. Wiegel of the Community Natural Gas Company of Dallas, has been elected president of the B. T. Utopian Club, employee organization of the Lone Star Gas Company and affiliated interests. J. A. Martin of the Lone Star was elected secretary and Guy Quisenberry of the Community Natural, treasurer.

NATURAL GAS SALES OF PUEBLO CO. INCREASE 109 PER CENT

Natural gas sales of the Pueblo Gas and Fuel Company of Pueblo, Colorado, were 21,000,000 cubic feet, for the month of September, representing a gain of 109 per cent over the same month of last year, according to a statement made in October by A. M. Talbott, general manager for the company. Total customer gain during the 12-month period was 871.

BRAHENEY IS VICE-PRESIDENT OF BYLLESBY CORP.

Bernard F. Braheney has been elected vice-president in charge of accounting of the Byllesby Engineering and Management Corporation, according to an announcement made on October 26 by J. J. O'Brien, president of the corporation. The new executive has been with the company since 1910, serving in various subsidiaries, and is known as an authority on public utility accounting throughout the industry.


LEGEND
Natural Gas Lines - Present
Additional Lines - Near Future
Natural Gas Areas - Present
Additional Areas - Future
Percentage of All Consumers Served
With Natural Gas in California
Present - 80 per cent
Near Future - 98 per cent
C. C. BROWN
Gas Administrator
Railroad Commission State of California
October 21, 1929

California Natural Gas System Rapidly Widening

NATURAL gas extension projects in California, which have been maturing with startling rapidity during the past few months, are bringing near the time when the State will possess an interconnected natural gas transmission system running from Roseville or communities even further north, to San Diego on the south,—a pipe line distance of more than 600 miles. More than 2,000,000 consumers, including 98 per cent of the State's population, will be on natural gas service. The next step in furthering plans for the Huntington Beach-to-San Diego link, to be laid by the Southern Counties Gas Company, bringing gas for distribution by the San Diego Consolidated Gas and Electric Company, is the hearing set for October 30 before the California Railroad Commission.

Claude C. Brown, gas administrator for the California Railroad Commission, has prepared the map shown above to indicate in a general way the service areas into which natural gas is penetrating as a result of recent developments.

The Challenge *of the* Future *to the* Gas Industry

(Continued from Page 27)

The decrease in unit cost will be the constant and challenging task of management. In this the gas industry has already succeeded well, possibly because the equipment is fairly simple, the processes well established and the methods uniform. The application of scientific management, particularly in its studies of personnel, is too far advanced to be subject to comment at this moment. Perhaps the greatest single weakness in the business executives today is the lack of imagination. The practical man with a sense of the importance of details is rarely imaginative, and yet we are in a phase of our industry which demands imagination.

In this respect, one wonders if gas men have realized the full significance of the rapid development of natural gas, of the long distance transmission of this important fuel, and of the significance of the newly applied scientific discoveries in the distillation of coal. Geologists have been beset by doubts as to whether or not there is an adequate supply of natural gas. Engineers have seriously questioned the advisability of long distance transmission from an economic point of view. After all, the whole principle of long distance transmission of power in general is more or less on the carpet. That is where a reasonable and restrained imagination comes in. For 20 years the geologists have been warning us that the world's supply of oil is terribly menaced by over-consumption. For 20 years they have been revising their estimates upward to such a degree that the statements they made in 1910 are now absolutely absurd. Deep drilling has opened up incalculable supplies of this precious fluid and as science and invention aid in the methods and processes of drilling, it is not hard to envisage wells of 12 and 15 thousand feet, with new sources yet unsounded.

An eager industry all along the line is waiting for the assurance that it can have a steady, uniform natural gas supply. A watchful industry is constantly searching for locations where fuel is cheap and abundant. The great army of workers and home seekers which is moving westward will be supported by the life-giving industry which is the real foundation of prosperity. It is not extravagant to say that the Boulder Dam and the long distance transmission of natural gas will do more to stimulate industry in the states affected than will any other single factor.

The movement to conserve natural gas throughout the nation and especially in California is one which compels the gas industry's enthusiastic support. What a tremendous field this offers for vigorous and courageous exploitation! And the situation has in it some elements which are absolutely unique; an example of which is the fact that natural gas need not compete with fuel oil in a disastrous degree. Since oil and gas are the common products of the well, the owners and exploiters will be interested in the market for the joint products. They will not hesitate to cooperate in the development of natural gas consumption, as they will fully enjoy the market this made for their commodity.

I have the definite impression that an ultra-conservative point of view prevails regarding natural gas. Your engineers and geologists have been slow to realize the extraordinary increase in the volume of this precious fuel. It is the old story of our ability to set aside out-grown ideas, which is perhaps the severest challenge which the modern industrial world presents.

For the gas industry as a whole, the remarkable invention of the Germans, recently exploited in this country, the distillation of coal, may spell a new era of economies in the fuel industry. This extraordinary process whereby gas and gasoline and even lubricating oil and all of the manifold coal tar products are extracted from coal in regions where it is more abundant than oil, is of vast importance to your industry. It is not unreasonable to say that the securities of companies now exploiting this process may increase 10 times their value in the next 10 years. What we need is vision—which is imagination in control: not the haphazard flights of fancy which are as weakening in their effect as an unexpended emotion, but a great vision of what this country is going to be in terms of modern science applied through invention and under the genius of American management.

Finally, the gas industry has not kept pace with the times in the establishing of facilities for research. The great chemical companies, and the great electrical companies, such as General, Westinghouse and American Telephone and Telegraph are spending literally millions of dollars in study of fields in which they operate. What is the gas industry doing to discover new uses for gas and natural gas? Something, to be sure, in equipment, for you have vastly improved the gas appliances, but what of the possibilities of changing natural gas into other forms which industry now demands? What of the devices such as the gas operated refrigerator; is the important task of developing new uses for your own commodity to be left to outside industrials? If the Zeppelin is here to stay, who is to provide the fuel which is demanded on such a tremendous scale that one can scarcely conceive it? In short, do you see your business only in terms of its every day routine and its present operation, or does your mind run out to the full development of every possibility which modern chemistry and mechanics and invention can create?

I can offer very little for the problems which your industry has already faced. The matter of rate-making has had your sustained and intelligent consideration. You

have learned to deal with the politicians and demogogues effectively and conclusively. You have withstood the onslaught of excessive control and regulation. You have profited by a reasonable and restrained control and regulation. You have gone hand in hand with the great electric power companies to a high plane in the community's appreciation. You no longer have to fight your way. The gradual change of view from fear of the trust to recognition of the economies of large scale production has paved the way for the merger, and in the merger you will find such vast economies that your earnings will constantly be expended under its sound influence. You have now only to bear your just share of the expenses of research; you have only to develop the imagination which will ultimately find its reward in the fruit of that research and you will find a responsive public willing to back you in every move for development, willing to forego present dividends for future profits; willing to support you generously and ably with their savings, as is already evidenced by many issues with which you are familiar. The public will not discount the future unless it is confident that you have the vision, and the vigor and the courage to develop that future and this is the challenge of the hour to your great industry.

NATURAL GAS CONSERVATION COMMITTEE NAMED

The Natural Gas Department of the American Gas Association has formed a Natural Gas Conservation Committee consisting of L. B. Denning, of the Lone Star Gas Company, Dallas, as chairman; Judge H. O. Caster of the Doherty Company, New York; John B. Corrin, of the Hope Natural Gas Company, Pittsburgh, Pennsylvania; A. F. Bridge, of the Southern California Gas Company, Los Angeles; and B. M. Nowery of the Louisiana Gas Company, Shreveport, Louisiana.

ARKANSAS WESTERN GAS COMPANY GETS PERMIT TO BUILD LINES

Arkansas Western Gas Company has been granted authority by the Arkansas Railroad Commission for the construction of several hundred miles of gas main in Johnson, Franklin, Madison, Benton and Washington counties in northwest Arkansas.

The company, which makes its headquarters at Fayetteville, proposes to construct a gas line from the Clarksville, Arkansas, gas field which will serve Bentonville, Rogers, Springdale, Fayetteville and other northwest Arkansas cities. Franchises are now held by the company in some of these towns.

CONSUMERS GAS CORP. TO HAVE PLANT AT KLAMATH FALLS

The Consumers Gas Corporation of California has announced its intention of locating a plant for the manufacture of gas in Klamath Falls, Oregon. The new plant and equipment would cost approximately $1,000,000, according to Colonel Fred E. Hoar, chief engineer of the company. Edward Sharry, attorney, and J. G. Rodman, treasurer, represented the gas company in transactions with the Klamath Falls city council.

DR. ARTHUR C. SCOTT OF DALLAS DIES UNDER OPERATION

Dr. Arthur C. Scott, consulting engineer of Dallas, identified with numerous utility surveys and tests, died recently while undergoing an operation at a Dallas hospital. He was 56 years of age and had been a resident of Dallas for 18 years.

Modern gas appliances are now on view in the display room of the Little Rock Gas and Fuel Company's new building, Little Rock, Arkansas.

Little Rock Gas *and* Fuel Co. Holds Open House

FORMAL opening on October 5 of the Little Rock Gas and Fuel Company's new building at Little Rock, Arkansas, was the occasion for a great celebration in which more than 10,000 people participated. Merchandising prizes valued at $1,500 were given away, as well as favors for all of the visitors. R. W. Curran, general manager of the Arkansas Natural Gas Corporation, parent organization of the Little Rock Company, acted as master of ceremonies.

Members of the company from Shreveport, New York, and Bartlesville, Oklahoma, and visitors from other cities in Arkansas, in addition to 10,000 Little Rock citizens, helped to make the opening an impressive affair.

The doors were opened at 8 a.m. and during the entire day the building was crowded with townspeople.

Among officials of the Arkansas Natural Gas Corporation who were present at the opening were: D. W. Harris, vice-president and general manager; J. R. Munce, vice-president; H. R. Dickerson, general superintendent; E. N. Watkins, secretary; B. R. Muirhead, assistant treasurer; John Mobley, chief engineer; J. C. Hamilton, assistant secretary, and W. D. Martin, purchasing agent; M. E. Larkin, manager of the company's new East Texas properties, and John L. Fletcher, advertising manager. W. M. Phillips and P. F. McBride, company representatives from Shreveport, attended as guests of Mr. Harris and Mr. Munce. Earle W. Hodges, director of public relations of the Henry L. Doherty Company and formerly of Little Rock, Arkansas, was present.

The new building is one of architectural beauty. The first floor is given over to the new business department, the securities division, collection and application departments. The second floor is divided into general offices, including that of Mr. Curran and the superintendent, as well as business offices, quarters for the engineering and accounting departments.

Sixteen-page special sections were published by Little Rock newspapers in recognition of the new structure.

MORRIS BARNETT IS WITH THE JAS. GRAHAM MFG. CO.

In the October issue of *Western Gas* an item was printed to the effect that R. G. Barnett had become affiliated with the James Graham Manufacturing Company. The item should have read that Morris Barnett, formerly San Francisco manager of the A. B. Stove Company, is now with the James Graham Manufacturing Company. R. G. Barnett is manager of public relations for Coast Counties Gas & Electric Company, with headquarters at Santa Cruz, California.

GAS SERVICE COMPANY GETS ESBON FRANCHISE

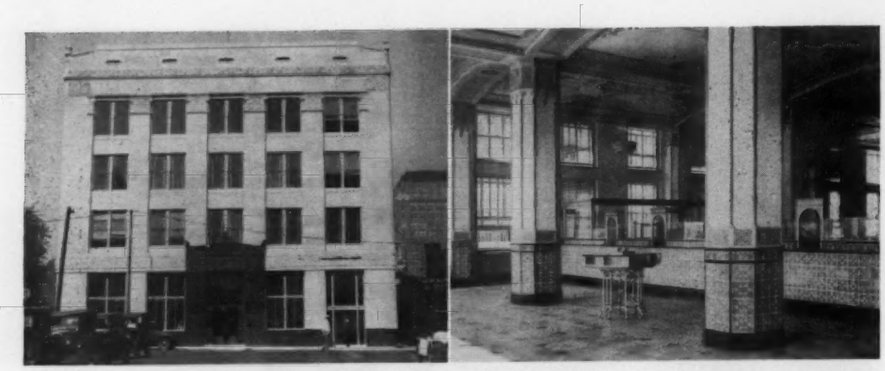
Gas Service Company, a Doherty subsidiary, has been granted the natural franchise in Esbon, Kansas.

PORTLAND PROHIBITS SALE OF DANGEROUS APPLIANCES

The city council of Portland, Oregon, recently passed an emergency ordinance prohibiting the sale of gas appliances that represent a menace to the consumer. It has been reported that a corps of salesmen are in the field selling such appliances, and the need for immediate regulation was realized by city authorities.

GEARY, OKLA., DECIDES NATURAL FRANCHISE NOVEMBER 5

The city of Geary, Oklahoma, will hold a special election on November 5, at which time granting of a gas franchise to the State Fuel Supply Company will be decided upon. The company is also seeking franchises at Bridge port, Hinton, Lookeba and Binger.



LEFT: Fort Worth Gas Company offices are now conveniently located in heart of business district. RIGHT: Interior view of lobby shows decorative tile used in wainscoting and counters.

Fort Worth Gas Company Enters New Offices

THE offices of the Fort Worth Gas Company are now located in the new building constructed by the company at Monroe and Eleventh streets. The building, construction of which was begun in January, has just been completed. Cost of the structure including site and equipment is approximately $350,000. It is 75 by 100 feet in dimensions and four stories in height. The foundation is designed to carry 10 stories and additional floors will be added when the company's expansion makes this desirable.

The front of the building is of Indiana limestone with black granite trim, and outside walls are of grayish white face brick. The structure is strictly fireproof, having fireproof walls between each floor and being constructed of reinforced concrete throughout.

Offices of the building are located on the first three floors, the fourth floor being given over to a large room about 60 by 100 feet in size which will be used for an employee club room, and for a place to hold cooking schools, appliance demonstrations, and other home service gatherings. This room is equipped with a stage 12 by 25 feet. Executive offices occupy the second floor.

Offices of the chart department, superintendent of distribution, drafting department, engineers, industrial department and advertising department, will occupy the third floor. The telephone switchboard is also on this floor and is isolated from the other departments.

Decorative tile used in the wainscoting is a feature of the main floor. This tile was imported from Valencia, Spain, and is designed in yellow, green, purple and black with black marble trims. The ceiling and wall panels in pastels of green, orchid and other shades harmonize with the tiling below.

A 25-foot driveway runs along the south side of the building, giving customers ample room for head-in or diagonal parking. This driveway connects with a paved alley in the rear through which the customers may drive after transacting their business.

The building is located near other utilities, and is across the street from the city hall.

For the past five years the Fort Worth Gas Company has had offices in the Burkburnett Building.

J. LINTON DAVIS IS NOW WITH HOUSTON NATURAL

W. B. Trammell, manager of the Houston Natural Gas Company, has announced the appointment of J. Linton Davis as purchasing agent of the Houston Natural. Mr. Davis was formerly assistant purchasing agent of the Houston Oil Company.

EDISON COMPANY TO USE MORE SO. CAL. NATURAL GAS

Southern California Edison Company expects to use 55,000,000 cubic feet of gas per day in its steam plant at Long Beach, California, adding 20,000,000 cubic feet to the amount already consumed. Gas will be delivered to the utility by several companies, and the supply will come from Signal Hill and Santa Fe Springs fields.

BELLEVILLE, KAN., GRANTS PERMIT TO KAN. PIPELINE & GAS CO.

Belleville, Kansas, recently granted a natural gas franchise to the Kansas Pipeline and Gas Company. Gas will be piped from Southern Kansas gas fields.

TISHOMINGO, OKLAHOMA, GRANTS NATURAL GAS FRANCHISE

Tishomingo, Oklahoma, has granted a natural gas franchise to A. C. Fletcher, P. E. Vail and associates. The Oklahoma Natural Gas Corporation will lay a supply line from Ardmore to the Rock Island underpass, 7 miles north of Madill, where franchise holders will secure their supply. The week before, Madill voted a gas franchise to Mr. Fletcher and Mr. Vail.

R. D. BURMASTER IS SALES SUPERVISOR AT FORT DODGE

R. D. Burmaster, assistant sales supervisor of the Peoples' Gas Light Company, has been named sales supervisor of the Fort Dodge Gas and Electric Company of Fort Dodge, Iowa.

SMITHFIELD, UTAH, GRANTS NATURAL FRANCHISE

Smithfield, Utah, has granted a natural gas franchise to John McFayden and L. B. Denning. The gas will be supplied from the Wyoming-Salt Lake pipe line.

Pipe Line Construction

(Continued from Page 40)

pany's experience of approximately $600 per case) on hernia cases alone. It is quite impossible to estimate the potential saving from the other rejections, but there is no doubt but that it would run into many thousands of dollars.

The manufacturers of equipment have developed, with the aid of practical pipe line construction men, machines that replace comman labor to a large extent and speed up the work. Manufacturers of pipe have increased the length of pipe joints, thereby requiring less welds or couplings per mile, which helps to increase the speed of laying and reduces the cost.

Rubber coupled lines also can be laid with much greater speed with the use of some of the equipment referred to in this paper and large numbers of men are eliminated.

A good deal of the detail necessary in the laying of large lines has been omitted. The whole organization must function in unison to have the work progress smoothly and without unnecessary delays, or the cost of the work will increase. The outstanding feature of present day pipe line building compared to methods of only a few years ago is the rapidity with which the work advances, using many less men than formerly.

Gas *for* El Paso Schools

(Continued from Page 41)

being secured by the Texas Cities Gas Company. In addition, main extensions necessitated by the new load came to a cost of $10,893, some 7,392 feet of main being laid. Thirteen schools are served from low pressure mains and 10 from high pressure.

The enrollment of the city schools of El Paso last year numbered 19,611, with 16,200 as the average attendance. Thirty additional teachers have been employed this year, in order to keep the school system abreast of population growth.

R. S. Reading, manager of the Texas Cities Gas Company at El Paso, points to a number of other important installations which indicate that natural gas is making remarkable headway in its heating load at El Paso. Among these installations recently secured are those at Fort Bliss, the Public Library, the City and County Hospital, and a number of hotels and apartments, as well as a long list of industrial users.

ROSEBAUGH NOW WITH SHELL OIL CO. AS GAS ENGINEER

Ted Rosebaugh, formerly with the Pacific Gas and Electric Company in the office of Frank Wills, has recently gone with the Shell Oil Company. Working here in his field as gas engineer he is doing certain investigation and research in connection with the development of propane and butane markets.

LAS VEGAS GAS CO. WANTS TO EXERCISE FRANCHISE RIGHTS

The Las Vegas Gas Company of Las Vegas, Nevada, has applied to the Nevada Public Service Commission for a permit to exercise its franchise to construct and operate a gas plant to serve that city with gas.

Reviewing Denver's First Year *with* Natural Gas

(Continued from Page 36)

gallon per million cubic feet treated is all that can be absorbed. The balance when an excess is introduced, condenses out in the station.

Natural gas was introduced in Denver on June 23, 1928, and after 12 months' use we find no evidence of increased leakage, nor of a drying out of diaphragms; neither is there any dust in the mains, and as far as we can see, conditions in our distribution system are unchanged over the manufactured gas days in Denver.

Before turning natural gas into Denver our lost and unaccounted-for per year per mile of 3-inch main equivalent was about 350 M.c.f. During the first year's operation under natural gas we have been able to actually reduce this lost and unaccounted-for gas to well below 200 M.c.f. per year per mile of 3-inch main. This reduction has been brought about without any special leakage program and without any special work on our cast iron joints—we have only carried on a normal routine leakage and maintenance program.

Due to our results we are, of course, very enthusiastic about our method of saturating natural gas with oil and water in order to eliminate leakage. We believe this not only reduces the leakage at the cast iron joints, but reduces all kinds of leakage, in steel pipes as well as cast iron pipes.

SERVICE CONDITIONS

In Denver, about 60 per cent of our system is two-inch gas mains, making it necessary to carry up to 2 lbs. pressure to give service. There was considerable doubt as to whether we would be able to supply service to househeating customers on account of the large number of small mains that make up our system. We have gone through a very severe winter, which averaged about 10 per cent more degree days than the average winter, and found that we could give 100 per cent service with our system. Of course, we made systematic pressure surveys during the winter months and located a few places where it was necessary for us to increase the size of the mains in order to take care of our load for next winter; but in all cases it was necessary to increase the size of the feeder mains, the two-inch supply mains having been found adequate.

Our experience in Denver leads us to believe that, while we must keep a close check at all times in order to anticipate need of pressure reinforcement before poor pressure is actually experienced by the customer, the distribution system of a gas company can be made to handle enormously increased quantities of natural gas, with very moderate investment for enlargement of mains.

TO HEAT 25,000 HOMES—GOAL

Our first year's experience with natural gas has been satisfactory. The results obtained have been better than our estimate. We have exceeded our budget for the year and practically every month. We are very optimistic about the future of the natural gas business in Denver. We expect ultimately to serve some 25,000 househeating customers, and, finally, over the 20-year period of the natural gas franchise we expect to pay a fair return on our investment, after paying all operating expenses.

Southern Counties Gas Company finds this new combination appliance-delivery and service truck well adapted for speeding up appliance installations.

Installations Speed Up *With* New Service Truck

W. E. GENTNER, district superintendent for Southern Counties Gas Company in the San Pedro, Calif., territory, is the originator of a combination appliance-delivery and service truck which the company has had built and put into service in the San Pedro District for a thorough trial under the supervision of District Manager O. R. C. Grow.

This is especially adapted for gas utility districts of moderate size and it is showing a substantial saving in its operation. All of the specifications were prepared by Mr. Gentner, who set out to design in one unit a truck which could be used for delivery, service and installation purposes, and at the same time be suitable for general use.

The body is on a Dodge truck chassis with a 1¾-ton capacity, and carries three large ranges easily, as well as meters, house regulators, tools, pipe and other equipment necessary for installing appliances.

The body is made of pressed steel and electrically welded throughout. According to Mr. Gentner, the use of old type bodies has always been a source of work for the repair shop and the new design eradicates this nuisance. The steel body is no heavier than the old style and is more durable, giving many more years of service.

The center of the body is used for holding appliances, and on either side of this space, running the full length of the body, are bins or compartments used for tools, fittings and other equipment. Mr. Gentner describes these bins as follows:

"There are four bins on the left side, three of which carry eight 5-Lt. tin meters or 16 5-Lt. iron case meters, while the fourth holds 16 house-type regulators. These bins have hinged covers and open from the top.

"On the right side there are 19 compartments with hinged doors, all opening out, on the side of the body. Fifteen of these hold fittings, and are 22 inches long, 14½ inches wide, and 7 inches deep. The other four are larger and can be locked. Two of these are for tools, and are 25½ inches long, 14½ inches wide and 13½ inches deep. The last two are approximately the same size, carry unions, brass fittings, soap cans, paint, etc. These compartments take up the entire right side of the truck.

"Another bin is on the bed of the body behind the driver's cab, which is used for large fittings. Space for storing pipe is provided by two troughs running the length of the body. Six eye bolts are welded to the floor and conveniently spaced for fastening the appliances with rope, to insure their safety in transit.

"Two steel skids stripped with wood facilitate loading and unloading without damaging merchandise. A folding step at the rear helps in discharging a load. A vise is at the left rear and a space is provided beneath for pipe while in it.

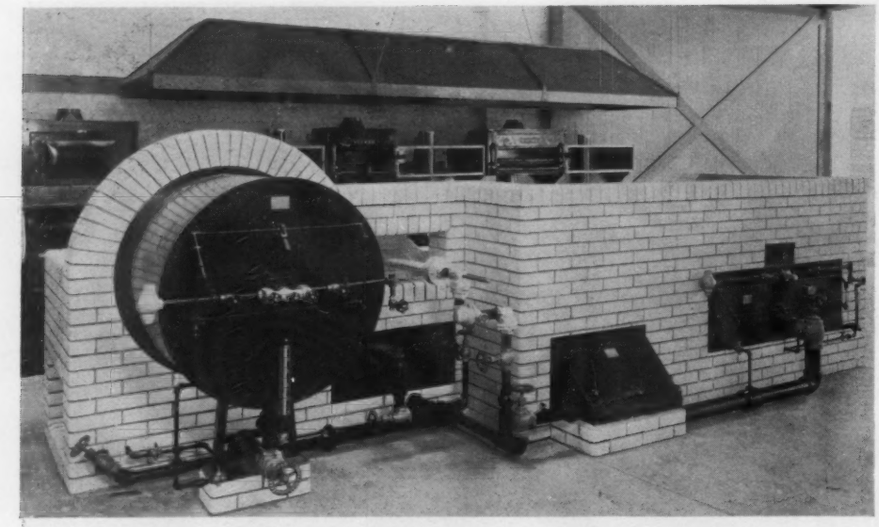
"Four catches are welded to the outer left side of the truck to fasten advertising banners announcing a company sale, thus associating the gas company with the activities of the truck."

The body can be converted into a service unit with very little trouble. Hangers for carrying extra pipe may be welded to the side of the truck and the meter and regulator partitions can be taken out to provide a tool chest for large equipment such as shovels, picks, bars, etc. The bin tops serve as seats for the workmen.

Still another feature is the ease with which the entire body may be removed and placed on another chassis. This makes it possible for the company to utilize the long service given by a steel body of this design.

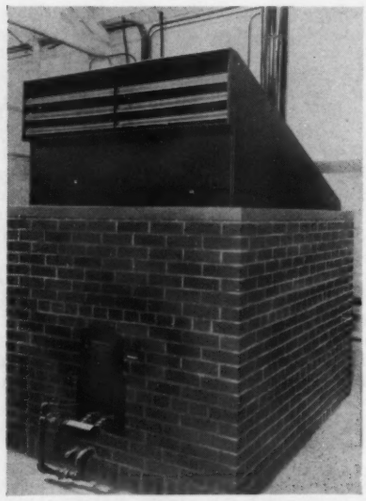
The truck has been given a thorough test and meets all the claims made by the designer. The accompanying photographs give excellent views of the truck as it is used in San Pedro.

The Southern Counties Gas Company is contemplating placing several trucks of this design in other districts of its territory.



AT LEFT:
Leahy multi-jet unit applicable for steam boilers from 5 to 250 and 500 h.p., and for brick and ceramic kilns using either high or low pressure gas.

BELOW:
Payne industrial furnace—may be used for heating auditoriums and large spaces, as well as for dehydrating practically any type of industrial product.



Creating *a* Cooperative Industrial Gas Exhibit *in* Los Angeles

(Continued from Page 31)

In addition to maintaining the exhibits now installed it is the intention of the Natural Gas Bureau to investigate all new uses of gas and to assemble all new types of equipment which prove worthy of recognition, thus making the exhibit the one central place in this section where the best equipment in these lines may be found.

Since the gas systems of the companies maintaining the exhibit extend into Santa Barbara, Ventura, Los Angeles, Orange, Riverside and San Bernardino counties—all but two of the counties of Southern California—the exhibit will prove of great value to a vast number of present and prospective gas consumers.

Of special interest to the various large and small manufacturers, who have become such an important factor in the development of this area in the last decade, will be the equipment for heat treating and metal melting, which is prominently displayed. Here will be found furnaces for hardening processes, such as carburizing, cyaniding and quenching. Annealing, malleablizing, normalizing and tempering can also be demonstrated. Special stress in these displays is being laid upon the importance of automatic temperature control, because of its effect upon the quality of the product turned out, its saving of labor and time, its saving of fuel and general lowering of costs of operation, as well as its general desirability. All heat treating equipment will, therefore, be fitted with the latest control devices—those which record the temperatures of all heats run, as well as those which merely indicate the temperature at which the various pieces of equipment are operating when under fire. As shown, this equipment will conclusively demonstrate the supremacy of gas over any other fuel or energy used for heat treatment in these industrial operations.

The generation of steam with gas is demonstrated in the displays of cast iron sectional low pressure steam boilers and high pressure tubular steel boilers. All of these boilers are of the very latest types, fitted with full automatic controls, low water feeds and cut-offs and safety pilots, as well as being equipped with the best and most approved methods of insulation and encased in the new and attractive jackets.

The gas generated steam from this equipment is put to practical demonstration by means of applying it to space heating, water heating, cooking, auto cleaning, distillation and many other uses. Direct water heating in large volume will be shown by means of the best and most economical equipment obtainable. Large volume systems for direct gas heating of air, for use in heating large spaces such as auditoriums and factories, will be shown, and the same equipment will also demonstrate its adaptability for commercial drying and dehydrating of all sorts of products.

Considerable space is being given over to hotel and restaurant ranges, ovens and miscellaneous kitchen specialties, featuring thermostatic controls and every latest and newest development and improvement. Along side of this section is to be found bakers' ovens of the various types, including deck ovens, rotating or revolving and travelling ovens.

Industrial and commercial gas burners are also being featured. Some of these are in brick setting which will show their application to various uses, prominent among these being the burners' adaptability for firing steam boilers of all types, cooking of such items as varnish, foodstuffs, etc.

It is the intention of the Natural Gas Bureau, from time to time, to set aside certain days or weeks when special shows will be given for the benefit of individual industries. These shows will ordinarily feature the putting on the market of some new type or kind of equipment which will be of interest to those in a particular industry. When these special shows are being held the exhibit will be open evenings as well as during the day, and because of the fact that the building has been especially fitted with adequate lighting facilities the evening showings will be very effective. In designing the lighting system particular thought was given the encouragement of proper lighting in factories and similar establishments. The importance of proper ventilation in places where men and women work was also considered and the building is equipped with an exhaust fan of large capacity so that burned gases may be quickly exhausted and the building maintained at comfortable temperature during all times.

It is the intention of the gas companies to call attention at various times to the exhibit in their general advertising, so as to keep the idea constantly before the public. The Bureau will also carry on a consistent campaign by direct mail advertising and education so that the exhibitors and the gas companies will get tangible results from their cooperative effort.

It is difficult to picture the many benefits which will be derived from this promotional effort, but it is certain that the public and the manufacturer will benefit equally with the gas utility companies who are sponsoring, financing and maintaining the exhibit. And to these utility companies there will be returned large dividends in good-will and increased gas sales.

ARKANSAS NATURAL GAS CO. GETS MONTICELLO FRANCHISE

The city council of Monticello, Arkansas, has granted a natural gas franchise to the Arkansas Natural Gas Corporation, stipulating in the contract that work begin on the distribution system within nine months time. Gas will be secured, according to report, from the Mississippi River Fuel Company Monroe to St. Louis line.

MILLION AND A QUARTER WILL BE SPENT ON COAST COUNTIES LINE

A $1,204,000 pipe line program is now under way by the Coast Counties Gas & Electric Company as part of its plan to bring natural gas into the entire territory of this utility. Pipe has been ordered to tap the P. G. and E.'s present natural gas line near Gilroy and convey gas to Watsonville. A 6-inch line will tap the main natural gas line at another point and carry gas into Gilroy. A 4-inch line will run to San Martin and Morgan Hill, where a distributing system is also being constructed. San Martin, Morgan Hill and San Juan will thus be served for the first time with gas, as none of these towns were on the lines of the Coast Counties Company serving manufactured gas.

A line will also tap the P. G. and E. Salinas main to take off gas for Hollister, and another 6-inch line will run to Santa Cruz. The pipe has all been ordered and shipments commenced from the mills of the National Tube Company.

It is planned to have this work finished shortly after the first of the year and the entire territory will be served with straight natural gas. The present oil-gas plants will no longer be in use.

In the Northern Division of the Coast Counties Gas & Electric Company's territory a line is being run from Pittsburg to Martinez and a line from Martinez to Crockett. This will tie in with the present 6-inch line that runs to the P. G. and E. junction at Giant. It is planned also to convert the entire Northern Division of the Coast Counties Co. to natural gas as soon as these lines are completed.

A distributing system is also being installed at Bay Point, where straight natural gas will be served.

SAN FRANCISCO HOLDERS ARE NEARLY COMPLETE

Construction of the Pacific Gas and Electric Company's new holder facilities in San Francisco are practically completed. The 8,000,000 cubic foot holder in Oakland is finished and the gas has been turned in. The Bartlett-Hayward construction crews have departed with their equipment. The larger holder in San Francisco will be turned over to the company somewhat ahead of schedule, the date originally set being November 15. Stacey Brothers Gas Construction Company are building the latter.

ARKANSAS POWER & LIGHT GETS MORE ARK. FRANCHISES

The Arkansas Power & Light Company has recently been granted gas franchises at Jonesboro, Walnut Ridge, Hoxie and Searcy, Arkansas. It is understood that gas is to be supplied these towns from the mains of the Monroe to St. Louis line.

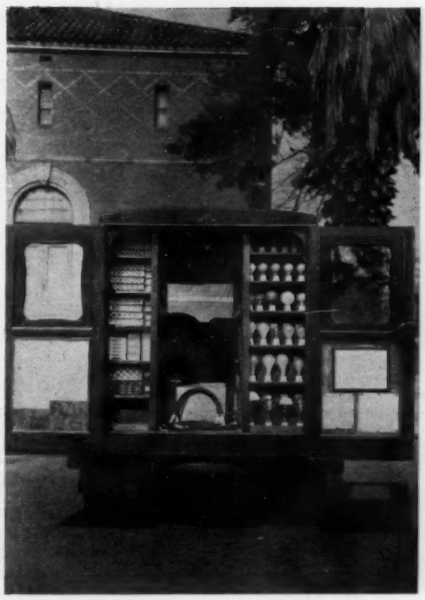
Distribution systems are being constructed by the company at Eudora, Dermott and McGehee, Arkansas, to receive gas from the Monroe to Memphis gas line.

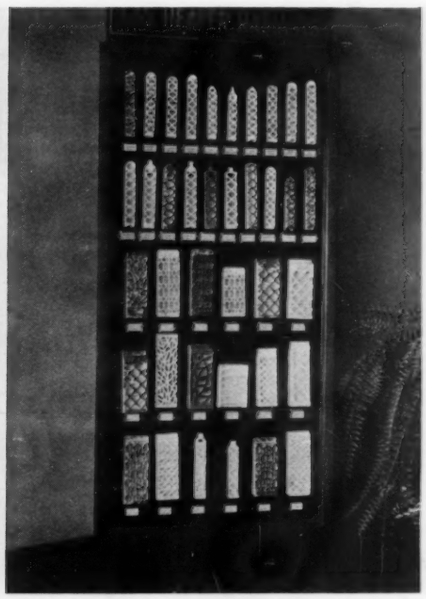
$40,000 TO BE SPENT ON LINE TO NOCONA, TEXAS

Texas-Louisiana Power Company is replacing a 2- and a 4-inch gas line from Nocoma in Montague County, Texas, to the gas field 10 miles north of the city, with a 6-inch main. About $40,000 will be spent on the change.

A. H. PERKINS APPLIES TO SERVE MALTA, MONTANA

A. H. Perkins has applied to the city of Malta, Montana, for a franchise for the service of natural gas to that town.





AT LEFT: Truck equipped with radiants for gas heaters, and with gas tubing and electric lamps, is subject to the call of customers needing the service. AT RIGHT Several gas radiant display boards of this type may be found in the branch offices of the Los Angeles Gas and Electric Corporation

Gas Heater Radiant Sales Service

By JOHN B. REDD

New Business Department
Los Angeles Gas and Electric Corp.

LOS ANGELES Gas and Electric Corporation has recently established a new service for customers which is proving a great convenience. A service truck, equipped with practically every style and type of radiant for gas space heaters, is subject to the call of customers who desire to replace broken radiants, or to purchase gas tubing.

The accompanying illustrations give an idea of how the company is handling the sale and delivery of gas heater radiants, approved gas tubing and Mazda lamps. This service is receiving favorable comment from many consumers who appreciate the fact that a telephone call or a word to a company employee will result in a call of the delivery truck which carries a complete stock of the small equipment.

The customer does not have to give the name of the heater or the number of radiants desired. Almost any radiant heater now out of commission can be put into good working order and modernized at a minimum cost to the customer, the cost amounting to the regular retail price of radiants.

Display boards showing many of the radiants now being sold have been placed in several branch offices of the company, and customers can obtain service by leaving their name and address at these offices. Employees can secure service in exactly the same manner as other consumers.

WASHINGTON CITIES WILL JOIN RANKS OF NATURAL GAS USERS

Work of laying gas mains from the Benton County field in Washington, to Prosser, Grandview, Sunnyside and Mabton, by the Northwestern Natural Gas Company, is progressing rapidly. The line from the source to the compressor plant is of 10-inch, while 6-inch pipe is being used for the distribution mains to the several towns. Franchises have also been secured at Kennewick and Pasco.

CONRAD, MONTANA, NOW BEING SERVED WITH NATURAL

Pondera Utilities Company has completed its line to Conrad, Montana, and is serving that town with natural gas from the Kevin-Sunburst field. The advent of the new fuel was the occasion for an elaborate program, a special feature of which was the lighting of two huge natural gas torches.

TWO GAS COMPANIES ASK FOR ALBUQUERQUE PERMIT

The Pecos Valley Gas Company, with headquarters in Clovis, New Mexico, has filed an application for a permit to serve the city of Albuquerque with natural gas. Another applicant for the natural franchise is the Southern Union Gas Company of Dallas, Texas.

BULLETIN DESCRIBES NEW LINE OF NAYLOR PIPE

Bulletin 29-2, issued by the Naylor Pipe Company of Chicago, Illinois, describes the new Naylor line pipe, and its installation for long-distance transmission lines for gas and oil. Photographs of actual construction jobs in Oklahoma, Texas, and other localities illustrate the booklet.

Second Natural Gas Line *to* Northern California Area

THE second unit of the Pacific Gas and Electric Company's natural gas transmission system is now under way. Surveys have been completed, pipe has been ordered, deliveries are being made, and crews are working on the line.

This unit involves the construction and operation of 312 miles of pipe. The new line starts at the company's compressor plant in the Kettleman Hills, which was scheduled to be put into operation November 1, and will continue north on the west side of the San Joaquin Valley, making gas available for the communities adjacent to the line. It will alo provide a supply of natural gas for the Sacramento Valley and the North Bay counties.

COMPRESSOR STATION

The compressor plant consists of five 760-horse-power Cooper-Bessemer compressors and will be gas engine driven. It will be installed and constructed at an expense of more than $500,000.

The San Joaquin system will tie in with the company's coast feeder lines at Milpitas and Richmond. These tie-ins will provide a duplicate supply or standby service in the event of the failure of either of the main lines. This valley line is so routed as to make natural gas service available to practically every community in the territory through which it passes.

A cross-country line will be extended from a point between Vernalis and Tracy to Milpitas, traversing the vicinity of Livermore and Pleasanton. At a point near Vernalis, a tap line consisting of 80 miles of 16-inch pipe will make natural gas available in Stockton, Sacramento and the upper Sacramento Valley. This branch line will be tapped to serve Modesto, Oakdale, Waterford and adjacent territory.

In the vicinity of Martinez the main feeder line will be tapped for an extension into the North Bay counties. The construction of the valley line calls for the installation of 22-, 20- and 16-inch pipe, making an expenditure of approximately $13,000,000.

The total expenditure on the part of the company in making natural gas available for customers throughout its system, amounts to some $26,000,000.

Company engineers plan to lay from one to three miles of pipe per day. Contracts have been let for 55,000 tons, or about 312 miles of pipe ranging from 16 inches to 22 inches in diameter. The pipe is being supplied by the A. O. Smith Corporation.

The number of joints in the new pipe line will be reduced by one-fourth through the use of 40-foot lengths in place of 30-foot lengths. This is a development which has taken place since the company's first line from the Kettleman Hills to the Bay area was constructed, and will reduce construction costs.

The first unit on the valley line now being installed is 41 miles in length, extending from the company's compressor plant in the Kettleman Hills to Panoche Junction.

This combined system will be capable of delivering 250,000,000 cubic feet of gas per day, and upon its completion straight natural gas will be served to all communities.

THIRD UNIT IN SIGHT

Steps will also be taken in the near future to go forward with the construction of the third unit of the company's natural gas transmission and distribution system by means of a line across Carquinez Straits bridge into Vallejo and thence reaching Napa, San Rafael, Petaluma, Santa Rosa and probably Healdsburg. Surveys are also under way to determine the feasibility of extending from Roseville to the company's Marysville network, which would bring natural gas as far north as Oroville, Marysville and Chico. When completed, the P. G. and E.'s network of natural gas lines will, in large degree, resemble its electric transmission and distribution system. It will require the transportation of natural gas for as long a distance as 360 miles, and more than 100 communities will be reached by the Company's natural gas mains within the next 12 months.

CLARITA S. HINDE TO FILL NEWLY CREATED POSITION

The Los Angeles Gas and Electric Corporation has created a new position—that of personnel assistant, and has named Mrs. Clarita S. Hinde to fill this place. Mrs. Hinde has been with the Public Relations Department of the company for the past two years. D. L. Scott heads the L. A. G. and E. Public Relations Department.

L. F. BABCOCK NAMED TO POST WITH ARKANSAS NATURAL

L. F. Babcock has been named as gas distribution engineer for the Arkansas Natural Gas Company at Shreveport, Louisiana. Mr. Babcock was formerly with the Pueblo Gas and Fuel Company of Pueblo, Colorado.

Lone Star System Gains *by* Recent Purchase

THE Lone Star Gas Corporation on October 21 announced the purchase of the Texas Cities Gas Company, operating in El Paso, Galveston, Waco, Paris, and Brenham, Texas, and Juarez, Mexico. H. A. Danner of Dallas is vice-president and general manager of the company and the Lone Star Gas Corporation announced there will be no change in the operating management or personnel of the newly acquired properties. H. C. Morris of Dallas has been named president of the company.

The Texas Cities Company was owned by the Union Utilities Incorporated, and was organized June 1, 1928. In the same transaction by which the Lone Star Gas Corporation acquired ownership of the Texas Cities Gas Company, the corporation also acquired the following additional properties: Council Bluffs Gas Company, operating a manufactured gas plant in Council Bluffs, Iowa; Guthrie Gas Company, operating a natural gas system in Guthrie, Okla.; The Northwest Cities Gas Company, operating manufactured gas plants in Walla Walla and Yakima, Washington, Lewiston and Clarkston, Idaho, Astoria, Eugene, Pendleton and Springfield, Oregon; and the Coos Bay Gas Company, operating manufactured gas plants in Marshfield and North Bend, Oregon.

The new properties will add more than 57,000 consumers to the Lone Star system, of which about 12,000 are now supplied by the Lone Star Gas Company, the pipe line subsidiary of the Lone Star Gas Corporation. With the acquisition of these properties the Lone Star system will supply natural or manufactured gas to approximately 1,600,000 people.

The pipe lines of the Lone Star at present supply gas wholesale to two of the towns in the Texas Cities group, Waco and Paris. El Paso is served by a pipe line of the El Paso Gas Utilities Corporation from fields in New Mexico. The Houston Pipe Line Company supplies Galveston, while gas is furnished Brenham by the M and M Pipe Line Company. The system serving Guthrie, Okla., is supplied with natural gas purchased from the Oklahoma Natural Gas Corporation.

In his formal announcement of the purchase L. B. Denning, president of the company, states that the Lone Star Corporation through its affiliated operating companies has been in the gas business for more than 20 years and has developed a pipe line system aggregating more than 3,500 miles, now serving in the neighborhood of 275 towns and cities.

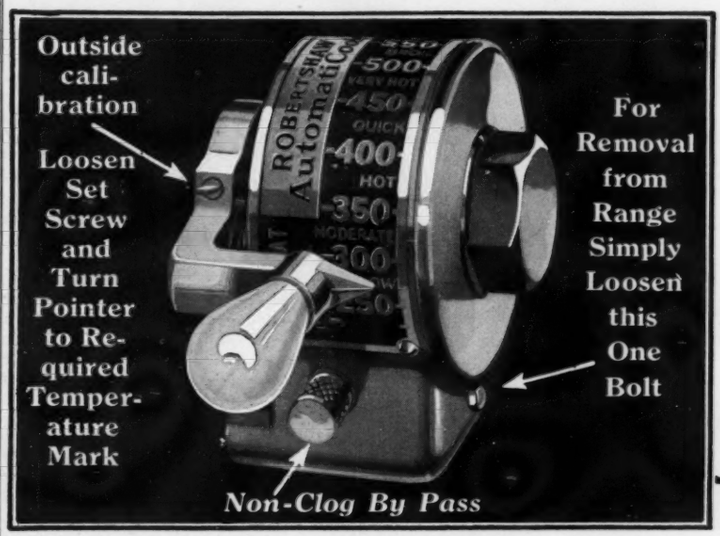
METTLER BULLETIN EXPLAINS USE OF COMBUSTION BURNERS

Lee B. Mettler Company of Los Angeles, California, has recently published a pamphlet explaining the operation and use of the Mettler Entrained Combustion Gas Burners for converting coal and oil fired steam, vapor or hot air boilers and warm air furnaces to gas. The brochure also gives data on burners for househeating, and a diagram of a typical combustion chamber arrangement for hot air, hot water or steam round type of boilers.

HART GAS CO. BOUGHT BY THE BUCKMAN GAS CO.

Hart Gas Company of Brownwood, Texas, has been bought by the B. E. Buckman Company of Madison, Wisconsin, a subsidiary of the Mid-States Public Utilities Company.

GAS COMPANIES and STOVE DEALERS



Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook

TRADE MARK

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

Non Clog By-Pass Pilot. Will not clog nor bind. Always moves freely and maintains its adjustment. Eliminates servicing, adjusted by turning either to the right or left.

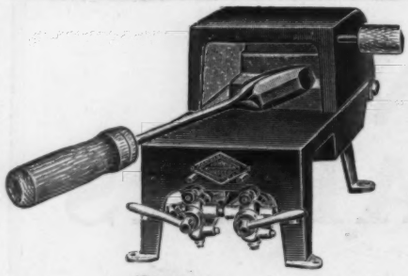
Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.

Youngwood, Penna.

The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges



Ask Any Shop Man About

Johnson No. 101 Soldering Furnace

Ask any shop man who has used a Johnson No. 101 Soldering Furnace how he likes it. He'll probably tell you in no uncertain terms that it's the best soldering furnace on the market! This furnace is built to give quick service, long service, and economical service. And it does those things in full measure! Write for details.

Johnson No. 118 Bench Furnace

A Popular Soldering Furnace!

But it goes farther than simply being an outstanding soldering furnace. It is also designed for melting soft metals and heat-treating carbon steel tools. Hence, we call it our No. 118 Combination Bench Furnace. Stoutly constructed. Efficient and economical to operate. No blower needed. Write for details.

Johnson No. 18 Hand Torches

are perfectly balanced!

This balance is attained by setting the burner at an angle. The result is easy handling by the operator. This automatic hand torch has a pilot light and shut-off valve, the valve being operated by a handy push button. Write for details of this efficient, inexpensive torch.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative: C. B. Babcock Co.,
135 Bluxome Street, San Francisco

Having Meter Trouble?

THEN install a MIST-D-FIER on your pipe lines. This new type of scrubber removes the cause—oil or water mist and solid particles. Prevents clogging or freezing of pressure regulators by the simple act of taking all suspended matter out of the gas.

The MIST-D-FIER eliminates a long-standing cause of customer dissatisfaction—accumulation of liquid in house meters and regulators.

Full information supplied in Bulletin No. 6. ASK FOR IT.

J. A. CAMPBELL CO.
Natural Gas Engineers
CONSULTING
DESIGNING
CONSTRUCTING
PHONE-416-93
P.O. DRAWER 669
LONG BEACH, CAL.

STEARNS-ROGER MFG. CO., DENVER
MID-CONTINENT AGENCY

M. F. Wales *O. J. Kauffman*

LOS ANGELES G. AND E. CORP. ANNOUNCES PERSONNEL CHANGES

EFFECTIVE November 1, several changes will take place in the personnel of the Customers Department of the Los Angeles Gas and Electric Corporation of Los Angeles, California.

Morris F. Wales of Oakland, California, formerly auditor, commercial manager and general agent for the Coast Counties Gas and Electric Company, has accepted an appointment as chief collector. Mr. Wales has had 11 years' experience in public utility accounting, and brings to his new position a thorough knowledge of Pacific Coast utilities.

O. J. Kauffman, formerly statistical clerk in the Accounting Department, has been appointed to fill the post of chief investigation clerk, left vacant by the resignation of H. H. Ranlett. Mr. Kauffman has been with the company for six years. Following a broad experience as principal of a high school, he became affiliated with public utility work. His experience includes the management and ownership of a utility at Velva, North Dakota.

George E. Keller has been named credit manager, a newly created position. The new work will take Mr. Keller into the Customers Department, of which O. L. Moore is manager, and will cover the establishment of credit by applicants for service.

HOUSTON PIPE LINE COMPANY TO BUILD LINE TO LONG POINT

Announcement is made of the construction by the Houston Pipe Line Company of a 12¾-inch gas line from Boling, Texas, to Long Point.

The line, which will be approximately 13 miles in length, will be constructed to serve gas to the plant of the Texas Gulf Sulphur Company, to be constructed at Long Point. The Houston company is serving gas to the Texas Gulf Sulphur Company's plant at Boling.

PUBLIC SERVICE CORP. TO SERVE MORE OKLA. AND TEX. TOWNS

The Public Service Corporation of Texas expects to supply gas to Shattuck and Gage, Oklahoma, by November 20. The Pampa gas fields will furnish the supply. Other towns which the company expects to supply from the Pampa field are Higgins, Perryton, Spearman, Magic City, Mobeetie, Miami, Canadian, Booker, and Glazier in Texas.

ARKANSAS POWER AND GAS CORP. GETS TUCKERMAN FRANCHISE

A 25-year gas franchise has been granted the Arkansas Power and Light company, according to press reports, at Tuckerman, Arkansas. W. N. Price is manager of the Tuckerman district for the company.

ORIGINAL DESIGN + EXCELLENT WORKMANSHIP + HONEST SELLING = LESS SERVICE DIFFICULTIES

No Pre-Mixer . . .

No Baffle Replacement . .

Absolutely Noiseless . . . .

Costs Less to Install . . . .

Only One Moving Part . .

Air-Cooled Safety Pilot That Requires No Service . . .

Build Your Gas Load at Least Expense

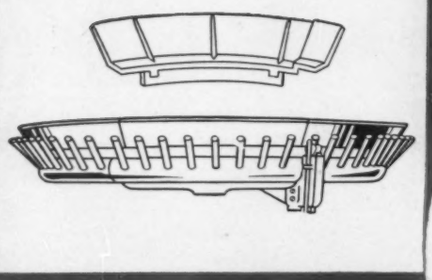
CUSTOMER SATISFACTION, plus lower installation expense and freedom from service calls, enables you to build your gas load at least cost with the COLUMBIA House-Heating Gas Machine. Absolute safety under all conditions is assured with the COLUMBIA Safety Pilot and Lighter shown and described on next page.

COLUMBIA
"The Gem of Them All"

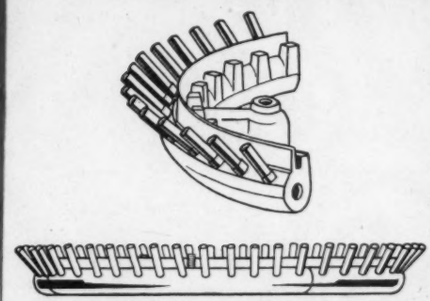
COLUMBIA Gas Burner
CONVERSION TYPE

The Heart of the Machine

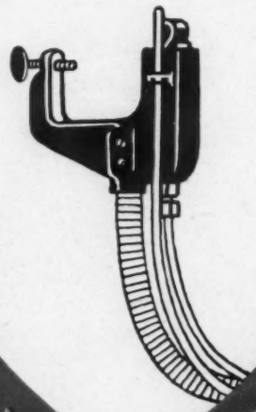
COLUMBIA Air-Cooled Safety Pilot



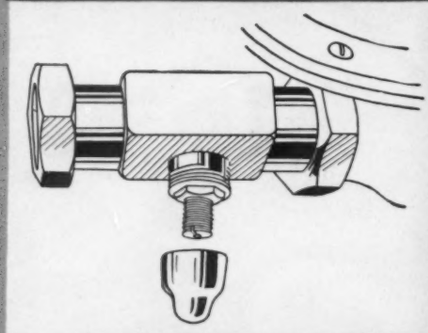
Baffles light in weight and never need replacement. No extra Baffle stock to carry. Baffles direct secondary air into close and intimate contact with flame tips, insuring complete combustion.



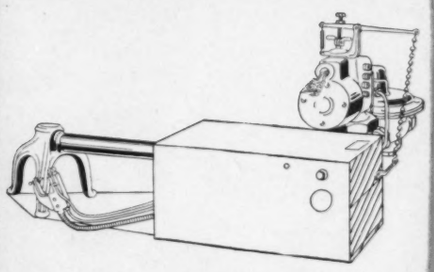
Burner Heads adjustable for height. Push Nipple Riser Joint connection from Burner Head to Duct-Base Assembly furnished in different heights without extra cost. Bunsen Burner Tips burn at low pressure and apply flame directly to sidewall of furnace.



Patented Air-Cooled Pilot requires no adjustment. Moveable with Burner Head. Absolutely positive in operation. Safety Pilot Lighter attachment eliminates all lighting difficulties.



The COLUMBIA is simple in adjustment. One adjustment for gas and one adjustment for air. No other adjustments required.



One size Duct-Base Assembly for all furnaces and boilers. Unit construction. Factory built and tested under both gas and electricity. Equipped with Minneapolis-Honeywell Electric Gas Valve.

Laboratory tests and field experience show that the COLUMBIA Burner operates with low ash-pit temperature, low stack temperature and high heat transfer, insuring maximum efficiency. Built in three types for use in warm-air furnaces and round boilers, rectangular boilers and Arcola-type heaters.

Simplicity of installation and freedom from service difficulties alone make the COLUMBIA more profitable to the Gas Company, while its many original, exclusive and fully patented features of design make it more efficient and more satisfactory to the house owner. Build YOUR gas load with the COLUMBIA!

Get the Details!

The COLUMBIA is the type of conversion equipment you've been hoping to find. Let us send you complete information and detailed description of the many features which make the COLUMBIA the Gem of them all.

THE COLUMBIA BURNER COMPANY

Manufacturers of Domestic and Commercial Gas Appliances

TOLEDO, OHIO, U. S. A.

Monroe-Atlanta Line *to Be* Finished *in* December

LATE reports received indicate that the Southern Natural Gas Corporation's line from Monroe, Louisiana, to Atlanta, Georgia, will be completed probably 15 days earlier than is called for in the city distribution contracts which specify December 31.

The Hope Engineering Company has been given the pipe line contract from Birmingham to Atlanta and the Sheehan Pipeline Construction Company has a contract for lateral lines extending north from this unit. Ford, Bacon & Davis has the general contract for the entire line, with Williams Brothers and the Oklahoma Contracting Company having sub-contracts on the line as far as Birmingham.

A statement released by the Southern Natural Gas Corporation announces that a contract has been completed with the Southern Cities Public Service Corporation whereby this company will supply gas from the line at retail in Columbus, Mississippi, Atlanta and Rome, Georgia, and Tuscaloosa, Anniston and Gadsen, Alabama.

Several changes in lateral lines have also been made since the original plans for the line were presented. According to present plans branch lines will be constructed to reach the following towns: in Mississippi, Yazoo Cuty, Durant, Kosciusko, Louisville, Macon, West Point, Columbus and Starkville; in Alabama, Birmingham and Bessemer will be served as well as Reform, Pelham, Saginaw, Vernon, Siluria, Calera, Newalla, Cordova, Alton, Lovick, Anniston, Coaldale, Sibleyville, Graystone, Ragland, Gadsen, Tuscaloosa, Attalla, and Alabama City. In Georgia gas will be supplied to Rome, Portland, Rockmart, Cartersville, Lindale, Calhoun, Cedartown, Plainville, Adairsville and Atlanta.

Approximately 450 miles of main pipe line and more than 400 miles of branch pipe line make up the project. The main line is 22 inches in diameter from Monroe to Birmingham, and 20 inches in diameter from Birmingham to Atlanta. Branch lines range from 4 inches in diameter to 18 inches.

Electric Bond and Share Company, the Standard Oil Company of New Jersey, Columbian Carbon Company and their subsidiaries will supply gas to the line.

BOULDER AND JOHNSTOWN, COLO., NOW USING TEXAS GAS

Boulder and Johnstown, Colorado, are now receiving natural gas service from the Denver-Amarillo line, through the mains of the Public Service Company of Colorado. The line passes within 1 mile of Longmont, and it is believed that a franchise will be sought in that city, which has a population of 7,000. Franchises have been secured or arranged for in all towns along the route of the line with the exception of Longmont. Towns to be served included Greeley, Berthoud, Loveland, Johnstown and Boulder. Franchise action in Loveland has been postponed until spring of 1930.

IMPROVEMENTS TO GAS SYSTEM AT WACO, TEXAS, ANNOUNCED

The Texas Cities Gas Company, distributing gas at Waco, Texas, has under way a $30,000 construction program at that place. Among the improvements to the city gas system, included in the program, is the construction of a 6-inch steel welded intermediate high pressure belt line through the business and industrial section of Waco. This will replace service to the industrials through a low pressure distribution system.

COLD CLIMATES

Look to Ward Floor Furnaces

FOR COMFORT

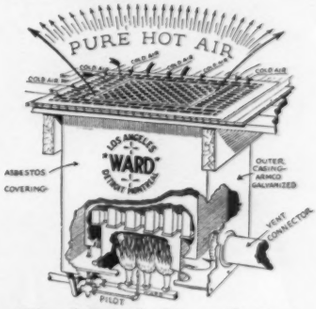
As evidenced by the above photo, Ward Floor Furnaces bring comfort to the winter climate of Oklahome City as well as taking the chill off the more moderate climates like Southern California. In fact, 50% of Ward installations are in sections where zero winter temperatures prevail.

Profitable for Dealers

Ward eliminates sweating of walls and windows by means of constant, natural circulation of the air. This is an important selling feature.

Ward Furnaces are easy to install. One man can make a complete installation in four hours. The servicing cost is low, too. One service man adequately handles the service needs of 70,000 Ward Floor Furnaces in Los Angeles County.

They are a profitable item for you to push. Write for complete details.



Healthful Ventilation

WARD HEATER COMPANY

1243 South Hope St., Los Angeles, Calif.

Modernity points the way to a new order of things in home furnishings and decorating. Manufacturers of gas appliances have been quick to sense the trend and new models appear, in keeping with the times. In the vanguard of utilities that keep pace with the New Day, is the Portland Gas and Coke Company. Newspaper advertising, stores and displays all reflect in spirit as well as in words the slogan, "Gas the Modern Fuel."

C. B. BABCOCK CO.

San Francisco Los Angeles

These new

The THOR Agitator Washer

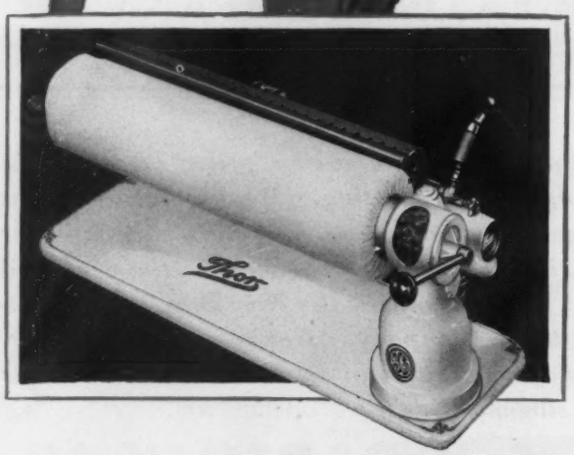
The fastest washer made. The tub is oven-baked porcelain enamel, inside and out. Lid is rubber guarded — rattle proof and splash proof. Fitted with gas burner under tub. A beautiful washer—made to give outstanding satisfaction and years of trouble-free service.

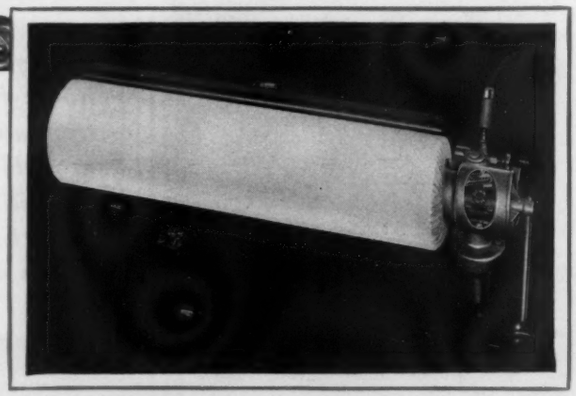
The THOR Table Model Gas-Heated Ironer

The Thor Rotary Iron with gas-heated shoe can be used on any convenient table. Has ironing surface of 10 flat-ironers. Anyone can operate it with 10 minutes' practice. Irons everything 75% faster than by hand. Presses men's trousers and women's skirts.

THOR Ironer for Combination Washer and Ironer

The Thor Rotary Iron with gas-heated shoe fits over the wringer shaft of the Thor washer to make a complete washer and ironer combination. It is as easy to change from washer to ironer as changing a phonograph record. The complete combination sells for about the price formerly asked for a good washer alone.





WORLD'S LARGEST MANUFACTURERS OF WASHING AND IRONING MACHINES

Gas-Equipped *appliances* by Thor

tap new profit mains for gas companies

AN entirely new source of revenue for Gas Service Companies has now been created by the addition of gas burner equipment in America's fastest selling line of washers and ironers.

For instance, a gas burner, with connections, has been installed underneath the tub of the famous Thor Agitator Washer. While previously noted for its efficiency, the addition of the gas burner now promises to multiply the demand for this popular washer.

It has made it possible to keep the water in the tub heated to the proper temperature throughout the washing period. Simply fill the tub once and light the gas. No cooling off. No adding hot water. This is an important improvement because every woman knows that *fast* washing and *clean* washing requires hot water.

Likewise, the Thor Table Model Ironer, and the Thor Rotary Iron (for combination washer and ironer) have been fitted with a gas-heated shoe. Note the descriptions above. The sale of Thor Ironers is increasing at an amazing rate because they are speedy and efficient and because they sell at a price every household can afford.

In promoting a more general use of these Thor products, Gas Service Companies are promoting their own as well as their customers' best interests. Territory allotments are now being made. We invite your correspondence regarding our attractive dealer franchise.

HURLEY MACHINE COMPANY
22nd Street and 54th Avenue
CHICAGO, ILLINOIS
Dept. K-11

WORLD'S LARGEST MANUFACTURERS OF WASHING AND IRONING MACHINES

Stockton Fire Brick Company

FIRE BRICK, INSULATING BRICK
HIGH TEMPERATURE CEMENT

High Grade Refractories
for

GENERATOR LININGS
CHECKERS
BOILER SETTINGS

OFFICE:
Russ Building,
San Francisco

WORKS:
Stockton,
California

THE BABY DIGGER

The Ideal Modern Way To Dig Gas Trench!

Cleveland Baby Diggers are unequalled for downright usability and trenching satisfaction. Compact — transportable — economical. Tough — fast — dependable. Precision built of finest materials. A wheel type trencher on full crawlers. You'll find Cleveland Trencher pioneering the features that count. Write for particulars.

THE CLEVELAND TRENCHER COMPANY
"Pioneers of the Small Trencher"
20100 St. Clair Ave.
Cleveland, Ohio, U. S. A.
Edward R. Bacon Co., 17th at Folsom Sts.
San Francisco, Cal., Distributor

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

Standard Gives Reasons *for* Entering Gas Field

THE Standard Oil Company of California, which has recently purchased control of the Pacific Public Service Company of which the Coast Counties Gas & Electric Company is a subsidiary, in October issued the following statement to the press:

"For the purpose of furthering the development and use of natural gas the Standard Oil Company of California has purchased control of Pacific Public Service Company, of which Coast Counties Gas & Electric Company is a subsidiary, and a distributor of manufactured gas.

"The Standard Oil Company of California owns in fee approximately 50 per cent of Kettleman Hills, where during the past year development has indicated an enormous potential natural gas production in addition to crude oil. This holding, together with other of its gas bearing lands, will enable the company to provide natural gas not only to its present customers, but to the rapidly growing industrial development in the area served by the Coast Counties Gas & Electric Company.

"This purchase is significant also in that it is developing additional outlets for natural gas at a time when the new California gas conservation bill, which prohibits the waste of natural gas, becomes effective."

In a letter to holders of securities of the Pacific Public Service Company and its subsidiaries, over the signature of K. R. Kingsbury, President of the Standard Oil Company, the following facts were verified:

The executive management of the companies will remain unchanged; it is the intention of the Standard Oil Company to retain the control lately acquired; the Standard Oil Company contemplates further development of the properties; there is no conflict between the interests of the Pacific Gas and Electric Company and the Standard Oil Company concerning the distribution of natural gas; the Standard Oil Company plans to continue the program of bringing natural gas to the entire area served by the Coast Counties Gas & Electric Company.

NEW ALL-GAS APARTMENT HOTEL FOR DALLAS

Of interest to gas engineers of Dallas, Texas, is the new Cliff Towers Apartment Hotel, opened October 15, which, with one exception, is an all-gas apartment house operating on two gas meters. One is an industrial meter for the boiler room application and the other a domestic meter for the tenants.

The apartment hotel, which has been completed at a cost of more than $1,000,000, embraces many new features, making it one of the most modern in the southwest. It is located on top of the white rock bluff, from which the Oak Cliff section of Dallas gets its name, and can be seen from all of downtown Dallas.

There are 104 apartments in the hotel and these are connected to one domestic gas meter, obviating the difficulty, from the standpoint of the gas man, of sending bills each month to the 104 renters. From the apartment owner's standpoint, the volume of gas through the single meter also provides for a cheaper gas rate.

TOOLE, UTAH, SOON TO HAVE WYOMING GAS

Toole, Utah, will soon receive natural gas from the Wyoming-Salt Lake transmission line, according to an announcement made by the Wasatch Gas Company, which will act as distributor of the gas.

A New

Silent

Dependable

An important development—The New No. 600-A Electric Gas Valve

Electric Gas Valve

This new type Time-O-Stat valve operates quietly and dependably. Positive, *snap acting*, the No. 600-A sets a higher standard for electric gas valves.

Its new simplicity of design assures *dependable* operation. Moving parts have been reduced to a minimum. No gears or levers are employed. No intermediate relay is used, eliminating a former common cause of trouble. It will not overheat.

A gas-tight case encloses the valve, preventing any possibility of gas leak. All electrical contacts are on the *outside* of this case, removed from any danger of contact with gas. The outer case, which covers the contacts, is beautifully finished in black enamel. Smaller, more convenient in size than older models, it is easier to install.

When power fails, the valve automatically closes. While power is shut down, the valve can be operated by hand. As soon as power is resumed, it automatically comes under control of the room thermostat.

Used in conjunction with a room thermostat the new 600-A valve provides silent and dependable automatic control of all low-pressure gas-fired equipment: industrial and domestic heating plants—boilers—furnaces—conversion burners—unit heaters and industrial ovens.

This new valve is an important addition to Time-O-Stat's well known line of automatic controls. All have been perfected in Time-O-Stat research laboratories. Together they form the most complete line of automatic controls in the gas industry.

Write for information concerning these products, or on any problems of automatic control. Time-O-Stat's research facilities are at your service.

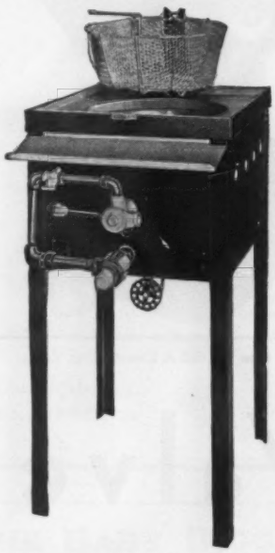
TIME-O-STAT
CONTROLS COMPANY
ELKHART, INDIANA

Successor to ABSOLUTE CON-TAC-TOR CORP. « LEACHWOOD COMPANY
TIME-O-STAT CORP. « CRAMBLET ENGINEERING CORP.

This

Institutional Gas Load Builder

Is in Operation in 3,000 Leading Restaurants



The Original PITMAN ECONOMY FRYER

For all Deep Fat Frying

in Restaurants, Hotels and Institutions

Selling Points

(1) Thermostat control—eliminates fire hazards.

(2) Removable Central Cone — Assures clean, "Golden Brown" products.

(3) Lower grease and gas operating cost.

(4) All frying now done in one container.

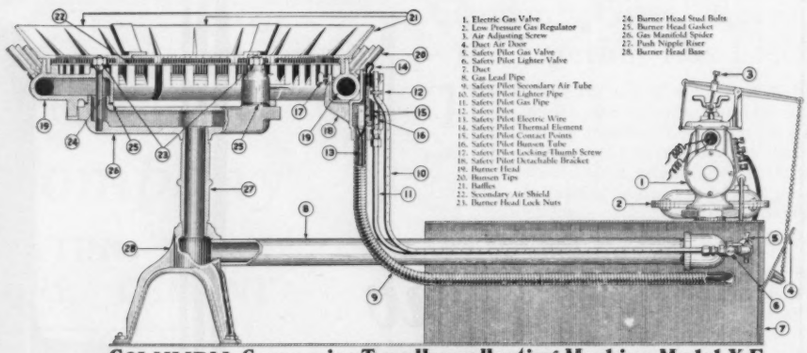
(5) Made in 3 sizes.

Literature and prices on request.

H.G.W. YOUNG

67 Hanover St. Boston, Mass.

National Distributor


1. Electric Gas Valve
2. Low Pressure Gas Regulator
3. Air Adjusting Screw
4. Duct Air Door
5. Safety Pilot Gas Valve
6. Safety Pilot Lighter Valve
7. Duct
8. Gas Lead Pipe
9. Safety Pilot Secondary Air Tube
10. Safety Pilot Lighter Pipe
11. Safety Pilot Gas Pipe
12. Safety Pilot
13. Safety Pilot Electric Wire
14. Safety Pilot Thermal Element
15. Safety Pilot Contact Points
16. Safety Pilot Bunsen Tube
17. Safety Pilot Locking Thumb Screw
18. Safety Pilot Detachable Bracket
19. Burner Head
20. Bunsen Tips
21. Baffles
22. Secondary Air Shield
23. Burner Head Lock Nuts
24. Burner Head Stud Bolts
25. Burner Head Gasket
26. Gas Manifold Spider
27. Push Nipple Riser
28. Burner Head Base

COLUMBIA Conversion Type House-Heating Machine Model X-E

New Conversion Type Gas Burner Introduced

Above is diagrammatic view of the Columbia conversion type gas burner, made by the Columbia Burner Company of Toledo, Ohio, and designed to operate on either natural or manufactured gas. This burner was shown for the first time at the A.G.A. Convention this year.

Features of the Columbia are an air-cooled safety pilot and lighter which requires no adjustment and which has but one moving part; adjustable baffles; Bunsen tips so arranged that flame impinges on side wall of fire-box; secondary air control and distribution; a single duct-base assembly for all sizes of burner heads, both round and rectangular. There is no pre-mixer and the burner is claimed to be noiseless in operation.

UNION PUBLIC SERVICE COMPANY OPENS FORT SCOTT OFFICE

The Union Public Service Company of Fort Scott, Kansas, is now located in its new quarters at 114 South Main Street of that city. Approximately 3,000 people attended the prize drawing of the company held on the official opening date, September 21. During the three days prior to the opening, 1,900 women registered at the new offices to become eligible for the prize drawing. The awards were two gas appliances.

R. C. Broscius is manager of the company at Fort Scott, Roy Bledsoe is new business manager, Charles T. Campbell is chief clerk and M. L. Carr, superintendent. The Union Public Service Company is a Cities Service property.

WALTER G. RICH RETURNS FROM EXTENSIVE BUSINESS TRIP

Walter G. Rich, district manager for Southern Counties Gas Company at Whittier, California, has returned from a business trip through the Middle West which included a stay of several days at the Electrolux factory in Evansville, Indiana, the American Gas Association Laboratory at Cleveland, People's Gas and Coke Company at Chicago, the Public Service Company of Northern Illinois, the Eastern Ohio Gas Company at Cleveland, gas company headquarters at St. Louis, Kansas City, Salt Lake City, and other centers of the gas industry.

SO. COUNTIES GAS CO. REACHES QUOTA IN ELECTROLUX SALES

Southern Counties Gas Company set a 1929 quota of 600 Electrolux gas-fired refrigerators for its sales force. Up to September 30, sales had reached 611 and, according to Clyde Potter, general commercial manager for the company, the total sales for the year may reach 800. Headquarters for the company are at Los Angeles, California.

McCAMEY, TEXAS TO HAVE NATURAL IN DECEMBER

The Southern Union Gas Company of Dallas, Texas, expects to supply gas to McCamey, Texas, during the middle of December, through a line to be constructed from the Pecos County gas fields. The line will be approximately 17 miles in length and will be 5½ inches in diameter. Bakersfield will also be supplied gas through the line. The company has also announced plans to serve gas at Farmington, New Mexico, through a line to be constructed from the gas field 13 miles distant. The M & M Pipe Line Company, the construction unit, and the Southern Union Gas Company are both subsidiary to the Murchison Oil Company of Dallas.

PITTSBURGH VALVE CO. ISSUES BOOK ON ATWOOD LINE

Pittsburgh Valve, Foundry and Construction Company, of Pittsburgh, Pennsylvania, has issued a pamphlet describing its new line of Atwood "interlock" necks, line welds and welded headers. Illustrations of the pamphlet show the various types of installations use on important jobs, including a header installed in a gas compressor station at Sterlington, Louisiana; and a river crossing installed for the Mississippi River Fuel Corporation.

NAYLOR PIPE CO. OPENS NEW TEXAS SALES OFFICE

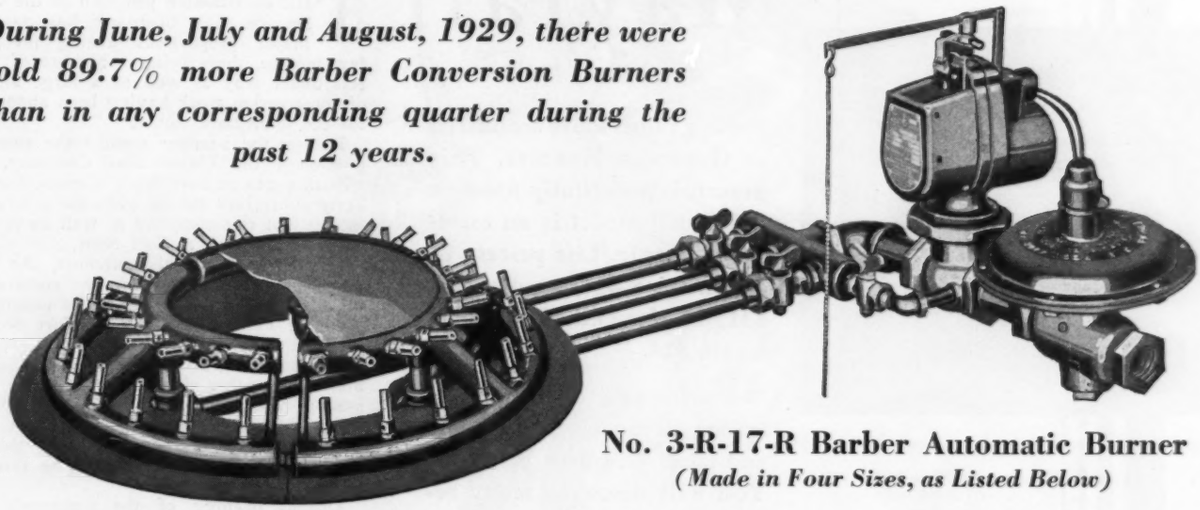
Naylor Pipe Company, Chicago, Illinois, manufacturer of Naylor line pipe, announces the opening of a new sales office at 601-3 Post Dispatch Building, Houston, Texas, and the appointment of E. C. Kirby as district sales manager in Texas and Louisiana with headquarters at the new Houston office.

WESTERN NATURAL GETS SEVERY, KANSAS, FRANCHISE

Western Natural Gas Company of Kansas has been granted the natural franchise in the town of Severy, Kansas.

BARBER *Automatic* JET GAS BURNERS

During June, July and August, 1929, there were sold 89.7% more Barber Conversion Burners than in any corresponding quarter during the past 12 years.



No. 3-R-17-R Barber Automatic Burner
(Made in Four Sizes, as Listed Below)

A COMPLETE AUTOMATIC CONVERSION GAS BURNER LINE—FOR 90% of your inquiries at prices attractive to every home owner.

Barber Automatic Burners as illustrated above include the following items—all Completely Assembled:

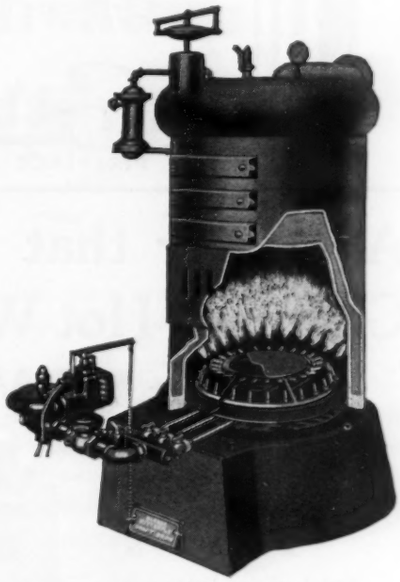
Complete Burner Assembly including Upper and Lower Baffles, Manifold, and Gas Shut-off Cocks to each Burner Unit.
Bypass Assembly for Pilot Supply.
Butterfly Draft Door Assembly.
Butterfly Draft Door Lift Assembly.
No. B-2210 Minneapolis Motor Gas Valve.
Minneapolis Room Thermostat.
Gas Pressure Regulator.

Specifications and List Prices

Barber Burner Number	Grate Dia. Inches Inclusive	List Price A	List Price B	List Price C	List Price D
2-R-17-R	16 to 18	$ 84.00	$110.00	$124.00	$156.00
3-R-17-R	19 to 23	94.00	120.00	134.00	166.00
4-R-17-R	24 to 27	104.00	130.00	144.00	176.00
5-R-17-R	28 to 31	119.00	145.00	159.00	191.00

Note:—List Price A—WITHOUT Room Thermostat.
List Price B—With Minneapolis No. 4010—Plain Room Thermostat.
List Price C—With Minneapolis No. 4710—1-day Clock Room Thermostat.
List Price D—With Minneapolis No. 7710—8-day Clock Room Thermostat.

When ordering be sure to state type of Thermostat desired.



Illustrating the New (No. 3-R-17-R) Barber Automatic Conversion Burner installed in a Round Boiler—through the clinker door opening, without removal of grate bars.

You can *sell* and *install* these modern scientific—moderately priced—Automatic Conversion Gas Burners—with very little effort—right in your own neighborhood, upon our "Specification Data Sheet" plan and reap a good harvest in *profits* and *friends*.

Remember — every Barber installation sells many more. Our Engineering Department will gladly specify every inquiry if furnished with the Trade Name, Manufacturer's Name and Number of the Furnace or Boiler. Write us at once for details, *discounts* and sales literature.

The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3702-04 Superior Avenue. Cleveland, Ohio

The Mayfair

Striking values today are offered in Guardian Heaters. This graceful, beautifully finished "Mayfair" model is an excellent example. List prices; 14 element size, $37; 12 elements, $31; 10 elements, $25; 7 elements, $18.

Write for new catalog illustrating all models in full colors and latest Guardian price list. You will discover many remarkable values.

THE GUARDIAN GAS APPLIANCE CO.
1364 East 47th St., Cleveland, O.

in the Cordeveaux finish

Cordeveaux finish is an exclusive Guardian feature. Its beauty is permanent. Cannot rust, tarnish or burn off.

Guardian

FIREPLACE AND PORTABLE HEATERS

A Heater that Will Deliver a Gallon of Hot Water for Every *1 Foot of Natural Gas.*

THE heater is finished in lustrous enamel.

300-lb. test copper-bearing Steel tank.

New Efficient Insulating Material.

Safety Pilot.

Combination Safety and drain valve.

2 sizes: 25 gal.—40 gal.

Pittsburg Monarch Automatic Storage Water Heater

Made in 2 Sizes
25 Gallons—40 Gallons

Pittsburg Water Heater Company

Offices at:

478 Sutter St.
San Francisco

2010 Jackson St.
Dallas

242 So. Western Ave.
Los Angeles

Cities Service *in* Major Construction Program

THE construction program of the Cities Service Gas Company has assumed major proportions during the past few months, there being a number of projects under way as well as a large amount of construction work having been announced for the immediate future.

During the summer months the company purchased the Union Gas Company, distributing gas at Fort Scott, Kansas, the Doherty subsidiary taking over the production interests of this company as well as the city distribution plant at Fort Scott.

Coincident with this purchase, the company announced plans for the construction of an 8-inch gas line from its compressor plant at Petrolia, Kansas, to Fort Scott, a distance of 50 miles. This line is expected to be completed about November 1 and will also supply other cities adjacent to the area, among them, Nevada, Missouri. At Petrolia the gas line will connect with three 16-inch lines of the company from southern Kansas and Oklahoma. Work on this line has been started.

Official opening of the company's new office at Fort Scott was held late in September. R. C. Brosius has been named as manager of this office.

Another item in the extension program is an 8-inch pipe line from Hutchinson, Kansas, to Lyons, Kansas. This line, which is 29 miles in length, will be completed in the near future.

The company has also extended its system in the Little River area through the construction of a 6½-inch line to the Sasakwa area, a distance of about nine miles.

Additional extensions are being made from the Dilworth compressor station in Oklahoma to Orlando, Oklahoma. Gathering lines will be laid from this point into the Marshall and Lovell gas fields.

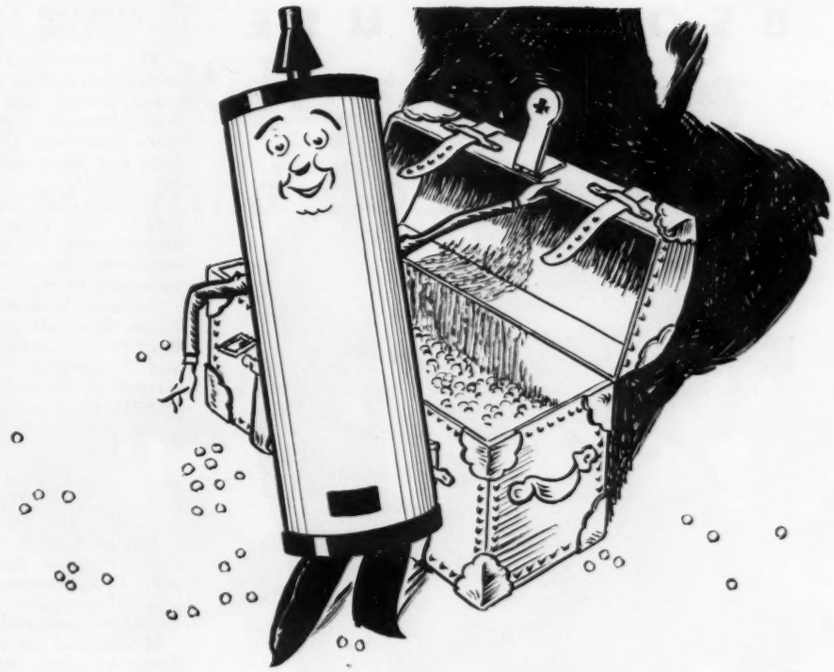
A 20-inch line originating at the Ottawa, Kansas, junction is being constructed to the Lawrence junction, comprising a distance of 19 miles. At Lawrence a 16-inch line will be continued toward Topeka, a distance of 15 miles. This line will augment the supply of gas to Topeka, Lawrence and other northeast Kansas cities and to St. Joseph, Missouri, and will be completed around November 20.

Cities Service has also announced plans for the extension of the company's main pipeline system from Atchison, Kansas, to Falls City, Nebraska, through Horton and Hiawatha, Kansas. This new line will be approximately 53 miles long, and will connect that area with the major gas fields in the southwest. The line will be of 6-inch pipe. The company also plans, according to report, to construct a line to Sabetha, Seneca and Marysville, Kansas, which will connect with the above line at a point north of Hiawatha.

Among the cities which have recently granted franchises to the Gas Service Company, affiliated interests, are Greenburg, Bucklin, Haviland, Mankato, Ellsworth, Beloit, Osborne, Smith Center, Glen Elder, Downs, Kanopolis, Cawker City, Luray and Horton in Kansas, and Superior and Hiawatha in Nebraska.

TEXAS DIVISION OF OIL ASSN. TO MEET AT SAN ANGELO

The Texas division of the Mid-Continent Oil & Gas Association will hold its 11th annual meeting at San Angelo on November 8. John F. O'Donohoe of Wichita Falls is president of the organization.



Don't put your water heater business in camphor for the winter ~ ~ ~

Not so many years ago, folks locked the automobile in the stable all winter and waited for the chirp of the robin before hitting the highways in Spring. Now they're sold and used all the year around . . . Until recently the big soup-makers let summer slide with nary a bowl of mock-turtle on the menu. Now they advertise soup and sell it twelve months a year. Once upon a time the Saturday Night Bath was a national institution. Now the *every-day* tub is Exhibit A among Social Requirements.

. . . . And to meet modern conditions, gas water heaters have been taken out of the winter camphor and put in the show window for all to see. It has been proved that they can be sold profitably twelve months in the year.

The Welsbach Hotzone water heater has helped to bring this about. It is a remarkable heater at a remarkable price, finely finished and efficient in appearance, sturdily made and reliable in operation. The name Welsbach is its guarantee of structural soundness.

If you haven't yet tried the Hotzone on a twelve months' selling basis, let us help you get started. The additional load on the lines makes it doubly profitable. Welsbach Co., Gloucester City, N. J.

Pacific Coast: 50 Hawthorne St., San Francisco, Calif.

Welsbach **HOTZONE**

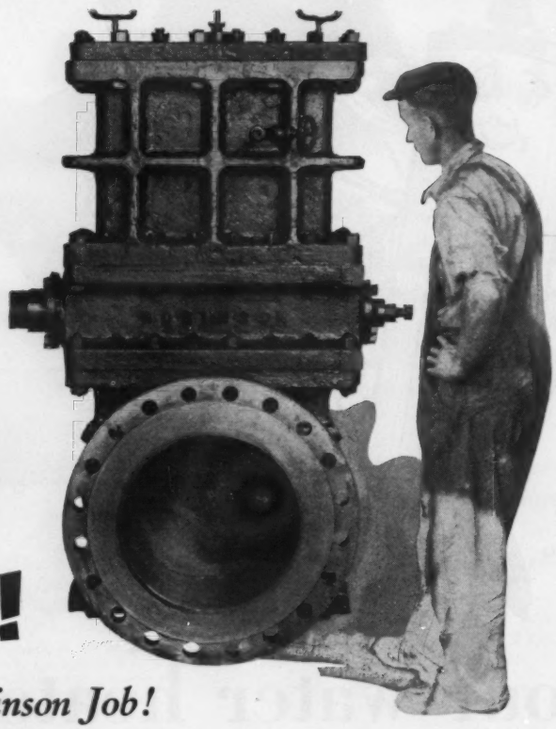
SELF-ACTING GAS WATER HEATER

Ready for Service

Member Pacific Gas Association

Member American Gas Association

OVER 8500 IN USE



BIG BOY!

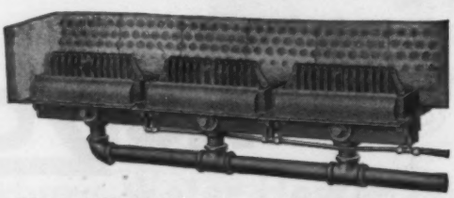
A Special Robinson Job!

Three of the largest Robinson Extra Heavy Steel Orifice Fittings ever made have just been completed for the Pacific Gas & Electric Company. They will be used on the company's Buttonwillow — San Francisco line. Weight each, approximately 3200 lbs. Size, 16 in. Working pressure, 600 lbs.

ROBINSON ORIFICE FITTING CO.
1435 SANTA FE AVENUE, LOS ANGELES, CALIF.
Distributors
The Foxboro Company . . Westcott & Greis, Inc.
English Distributor
Walker, Crosweller and Company
54-58 Queen Elizabeth Street, London, S. E. 1

ROBINSON ORIFICE FITTING

R. M. C. Gas Burner



Unexcelled for Conversion Installation
ROTARY MANUFACTURING CO.
5720 Long Beach Avenue Los Angeles, California

ASHLAND AND PRATT, KAN., RECEIVE NATURAL SERVICE

The Public Service Company of Kansas, with headquarters at Pratt, Kansas, in September turned gas into Ashland and Pratt mains through a gas line which is also to serve Protection, Coldwater, Haviland, Cullison and other cities in southwestern Kansas.

The gas line originates in the Watchorn field in Clark County, Kansas, and embraces approximately 70 miles of main line system constructed at a cost of a million dollars, according to report.

Ashland is served through 10 miles of 3-inch line laid from the Watchorn field. Pratt receives gas through 35 miles of 8-inch and 24 miles of 6-inch pipe extending eastward from the wells. Protection, Coldwater and Haviland are to be served through two 1-inch lines connecting with the main line.

F. W. BENSON NOW TREASURER OF AMERICAN METER CO.

At a meeting on September 30 of the board of directors of the American Meter Company, F. W. Benson of Philadelphia was appointed treasurer of the company, and elected to membership on the board.

Mr. Benson for many years has been assistant treasurer, and fills the vacancy caused by the death on June 30 of William E. Helme, who was treasurer and vice-president of the company. The Treasurer's office of American Meter Company is located at 700 Bulletin Bldg., Philadelphia, Pa.

MISSOURI-KANSAS PIPE LINE CO. FINANCIAL OFFICES IN CHICAGO

The Missouri-Kansas Pipe Line Company has transferred the financial offices of the company to Chicago. Operating headquarters will remain at Kansas City, Missouri, with Burt Bixby in charge. W. T. Stevenson has been placed in charge of the Chicago office of the company at 10 South La Salle street.

TABER, ALBERTA, NOW GETTING NATURAL IN BUSINESS SECTION

Taber, Alberta, is now receiving natural gas through the mains of the Canadian Western Natural Gas, Light, Heat and Power Company of Calgary. The business section has already received service, and extensions to the residence districts will be completed early in 1930.

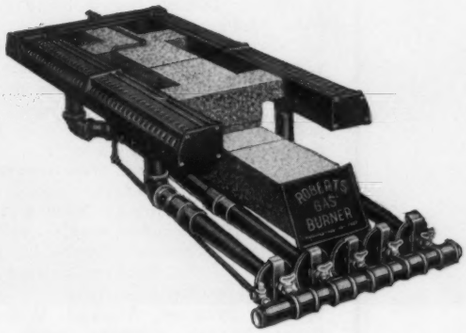
IOWA FALLS, IOWA, TO HAVE NEW WATER-GAS SET

The Central States Electric Company of Iowa Falls, Iowa, has just placed a contract with The U. G. I. Contracting Company division of United Engineers & Constructors Inc. for one 4-foot carburetted water gas set with Chrisman Cycle, circular platform, high duty condenser and by-pass, electric fuel hoist and charging barrow, for its Iowa Falls plant.

ARROW PIPE LINE CO. ASKS PERMIT TO BUILD LINE

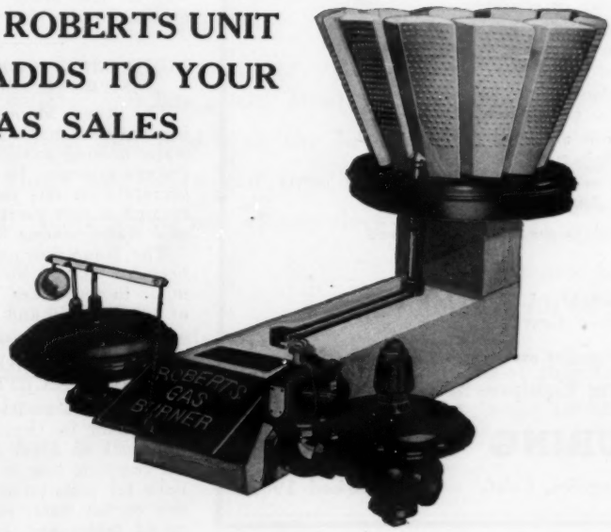
A request for permission to construct 12 miles of pipe line from gas wells in Sherman township in Kansas to Bonner Springs in Wyandotte county and to DeSota and Eudora in Douglas and Johnson Counties has been asked of the Leavenworth county commissioners by the Arrow Pipe Line Company of Delaware.

There's a Roberts Unit to fit every size and type of heating plant



MOST
HEAT
PER
DOLLAR

EVERY ROBERTS UNIT SOLD ADDS TO YOUR GAS SALES



SELL MORE GAS BY SELLING ROBERTS CONTROLLED GAS HEATING UNITS

WRITE TODAY FOR CATALOG AND HOUSE HEATING DATA BOOK

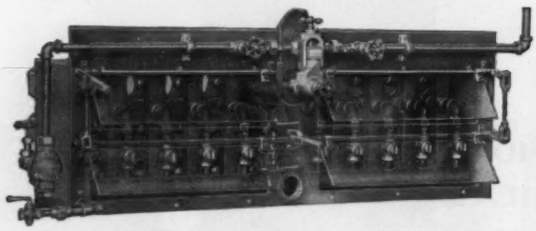
ROBERTS-GORDON APPLIANCE CORPORATION

DELAWARE AVENUE AT TUPPER STREET

CURTISS BUILDING BUFFALO, N. Y.

The Leahy Multi-Jet Unit

Is an investment that will increase operating efficiency and decrease operating cost



Patents allowed and pending
View showing Combination Gas and Oil Unit

Designed for Front, Rear and Vertical Firing, Burning Efficiently Low or High Pressure Natural or Manufactured Gas

Exclusive features that have created exceptional demand for this unit:

1—Designed with no draft loss.
2—High overloads on low gas pressures with minimum draft.
3—Each individual burner receives correct air and gas mixture for maximum efficiency.
4—Auxiliary air opening around tile increases overload capacity of unit with no sacrifice in efficiency.
5—Correct amount of air for combustion can be obtained with minimum opening in stack damper, which retains heat in boiler instead of letting it escape up the stack.
6—Does not require high gas velocities through burner in order to draw sufficient air for combustion.
7—All primary and auxiliary air is admitted through unit and evenly distributed to each burner.
8—Equal distribution of heat full width of firebox.
9—All parts individual and removable.
10—The oil burner can be inserted in the unit or removed instantly.
11—Equal efficiency on gas or oil.

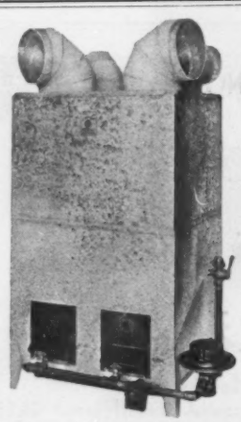
An Efficient, Indestructible. Portable Unit with a Low Initial and Upkeep Cost

Request literature, data, and installation prints on our

Oil and Gas Burning Equipment

LEAHY MANUFACTURING COMPANY

1804-1810 East 8th Street Los Angeles, Calif. Established 1902



Furnace Service

How much of your overhead is represented by unnecessary trips to your job?

In other words does your furnace or your service man render your service?

Install **Perfection Multiple Unit Furnaces** and cut down on your overhead.

TESTING LABORATORY APPROVED AGA

L. H. Freymuth Jr

311 East Pico St., Los Angeles

NEW LINE TO HUTCHINSON, KANSAS, IS NEARLY COMPLETED

KANSAS Pipe Line & Gas Company, a subsidiary of the North American Light and Power Company, is bringing to rapid completion its 16-inch pipe line from the gas wells at Medicine Lodge in Southwestern Kansas to Hutchinson, where connection is made with the main line of the company serving Hutchinson, McPherson, Salina, Abilene, Junction City, Fort Reilly and Manhattan in Central and Eastern Kansas. The line from the fields to Hutchinson will be approximately 75 miles in length.

Another 16-inch line is being constructed from McPherson through Abilene to cities in Northern Kansas, among them Marysville, Washington, and Concordia. A branch from this line will be extended northwest to serve southern Nebraska towns. Gas is expected to be turned into mains in the Northern Kansas towns by January 1.

According to recent press reports the gas will be delivered at the Kansas-Nebraska border to the Nebraska Natural Gas Company of Lincoln for service to towns in southern and central Nebraska. This company is reported to have secured in recent months franchises in Crete, Wilber, Blue Springs, Syracuse, Ashland, Wahoo, Wood River, Shelton, Gibbon, Sutton, Harvard, Clay Center, Edgar, Deshler, and Hebron in Nebraska. At Grand Island, gas from the Hastings and Kearney systems will be supplied to the local distributing company operating the manufactured system. Right of way is now being purchased through Nebraska for the line, reports state.

RUUD MFG. COMPANY ANNOUNCES IMPROVEMENT IN ITS LINE

The Ruud Manufacturing Company has just issued a new set of literature on volume water heating and Ruud multi-coil automatic storage systems. In connection with the new literature on this subject, the company also created a new merchandising plan for volume water heating selling.

The Ruud line of multi-coil systems has been redesigned and improved and is now made in four sizes, having heating capacity of 100, 200, 350 and 500 gallons per hour.

AMERICAN RADIATOR COMPANY ISSUES ARCHITECTS HANDBOOK

The American Radiator Company of New York, late in October issued an architects handbook on Ideal gas boilers, which shows the complete line of this equipment and the data for installation. There is also a section on hot water supply which contains detailed tables and formulas for determining the proper size and type for any specialized job.

NORTHWEST TEXAS GAS CO. GETS COALGATE FRANCHISE

Voters of Coalgate, Oklahoma, have recently granted a gas franchise to the Northwest Texas Gas Company of Vernon, Texas. Plans for serving gas call for the construction of a 10-inch line from the Allen gas producing field to Coalgate.

EL CAJON, CALIF., NOW BEING SERVED WITH GAS

El Cajon, California, is now receiving gas through the mains of the San Diego Consolidated Gas Company of San Diego. The company has also installed a new 6-inch feeder main via Pacific Beach to La Jolla, completing the second feeder line to the latter town.

Telling consumers of the health giving value of radiant heat is more than a sales endeavor,—it is real public service.

Winter Evenings and the Summer Sun

The Summer sun has gone. Much of the radiant heat and health of the invisible ultra violet and infra red rays has departed. Long nights and cloudy days are at hand.

But there is still promise of healthful heat and good cheer for those who know of the Humphrey Radiantfire. For in its pleasant penetrating glow are found many of the health giving rays of the Summer sun.

If you are not already familiar with this, the most important development in the gas heating world,—write for a copy of the new booklet, "When Heat is Health." It will be furnished without cost.

Let this be the gas industry's winter message to the nation,—"Turn on the Sun in every Home."

The **HUMPHREY**

Radiantfire

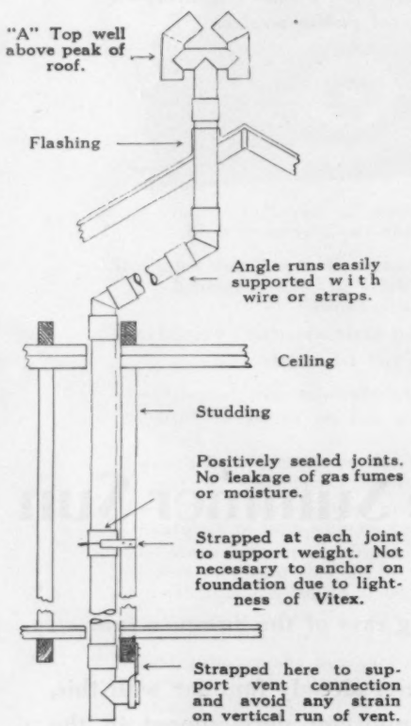
TRADE MARK REG. U.S. PAT. OFF.

Manufactured by
General Gas Light Co.,
Kalamazoo,
Michigan

Pacific Coast Manager
C. B. Babcock,
135 Bluxome St.,
San Francisco

VITEX The Perfect Gas Vent & Flue Pipe

Illustrating Method of Installing Vitex on Concealed Runs.

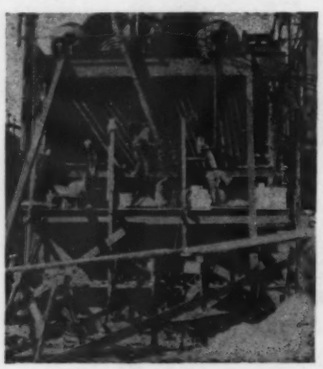

"A" Top well above peak of roof.
Flashing
Angle runs easily supported with wire or straps.
Ceiling
Studding
Positively sealed joints. No leakage of gas fumes or moisture.
Strapped at each joint to support weight. Not necessary to anchor on foundation due to lightness of Vitex.
Strapped here to support vent connection and avoid any strain on vertical run of vent.

Solves the venting problem where no flue exists. Can be installed at low cost without foundation. Semi-vitrified, light in weight, absolutely non-corrosive and high in insulating value. Improves combustion by increasing draft.

Samples, prices and installation data gladly furnished on request.

PLANT
Rubber & Asbestos Works

537 Brannan Street **San Francisco, California**



Fire Brick Contractors

Established 1906

J. T. Thorpe & Son

Inc.

Specializing in Gas Generator, Boiler, Still and Furnace Brick, Industrial Furnaces, Retorts, Kilns, Brick Smokestacks.

A capable Engineering Department competent to advise on any problem involving firebrick construction.

San Francisco 417 Market St. **Seattle** 305 White Bldg. **Portland** 609 Ry Exch. Bldg.
Los Angeles 321 W. 3rd St.

B.T.U. CONTENT REACHES NEW HIGH MARK IN SO. CALIF.

During the month of September the heating value of natural gas distributed in Southern California areas reached a high average of 1174 B.t.u. per cubic foot. A maximum of 1199 B.t.u. was reached, and a minimum of 1131 B.t.u. was registered, which is higher than the minimum for any previous month.

According to daily B.t.u. tests, the heat values maintained a high level through the month, starting on September 1 with the peak of 1199. On September 10, the test showed 1171, on the 15th, 1168. On September 24 the minimum of 1131 was reached, and on September 29, tests showed the heating value to be 1198 B.t.u. per cubic foot.

W. S. LEECH NOW ON STAFF OF G. M. BASFORD CO.

Willoughby S. Leech, specialist in industrial advertising, has joined the staff of the G. M. Basford Company, and will be in charge of a branch office which the company has opened in the recently completed Koppers Building, Pittsburgh, Pennsylvania.

Mr. Leech is known through his former sales and advertising connections with manufacturing companies in the district, including Westinghouse Electric and Manufacturing Company and A. M. Byers Company, and through the advertising and sales counsel work in which he was engaged for about eight years.

ARGUS GAS CO. EXPECTS TO SERVE MORE KANSAS TOWNS

Argus Gas Company of Dodge City, Kansas, expects to turn gas into the mains of a number of Southwestern Kansas towns between Elkhart and Dodge City by the first week in November, according to announcement of A. J. Hardendorf, vice-president of the company.

The line originates in the Hugoton gas field going northeast to Dodge City. A line extending southwest from the field serves Rolla and Elkhart.

Towns to be served in this area are Dodge City, Meade, Fowler, Plains, Montequma, Cimarron, Satanta, Sublette, Moscow, Copeland, Ensign, Rollo and Elkhart.

HOWARTH S. BOYLE IS SALES PROMOTION MGR. FOR SERVEL

Howarth S. Boyle has been appointed sales promotion manager for Electrolux, the gas refrigerator, according to an announcement made by H. W. Foulds, vice-president in charge of sales, Servel Sales, Inc. Mr. Boyle will make his headquarters at the Evansville, Ind., plant of Servel, Inc.

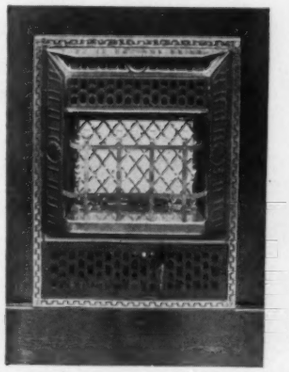
For the past several years Mr. Boyle has been director of sales education for the Standard Gas Equipment Corporation, and prior to that was sales service manager of the U. S. Rubber Company, Boston, Mass., branch.

VEEDER SUPPLY & DEVELOPMENT CO. HAS KANSAS CHARTER

The Veeder Supply and Development company, with Emmett C. Veeder of Cherryvale, Kansas, as president and Kirke C. Veeder of Independence, Kansas, as secretary-treasurer, has been organized under a Kansas charter to develop gas properties in Southeastern Kansas.

It is planned by the company to lay a line from the Island gas field near St. Paul, Kansas, to Parsons, a distance of 16 miles.

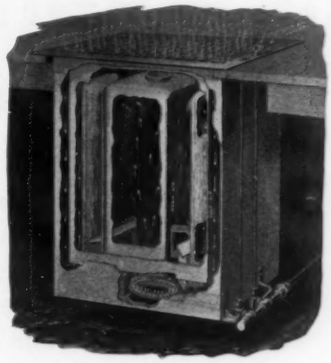
Pacific A. G. A. Approved Appliances
will get you in on every heating job in your territory



"Pacific" No. 02 Floor Furnace

Approved by A.G.A.

A sturdily constructed pipeless Unit of 20 gauge Ingot Iron with an attractive floor grill of heavy cast iron, finished in antique bronze or brass. Heating element has top and bottom of cast iron, assuring many years of uninterrupted service.



Wall Heaters

—Two Models

Models 7 and 8-A Wall Heaters are equipped with the Multi-tubular burner which has proven so popular and efficient in other "Pacific" products. The attractive appearance and sturdy construction coupled with its efficiency in rendering cheerful heat will prove a quick seller and should be displayed on your sales floor.

The Pacific Furnaces, with the recognized advantages of the "round" design, eliminates all corners and dead air spaces. It promotes better circulation, giving an abundance of heat more quickly. The heating element is completely welded throughout, is gas tight, and permits no combustion fumes to escape. The heating unit is of 20-gauge pure Ingot Iron metal. They are equipped with the special Multi-Tubular Burner.

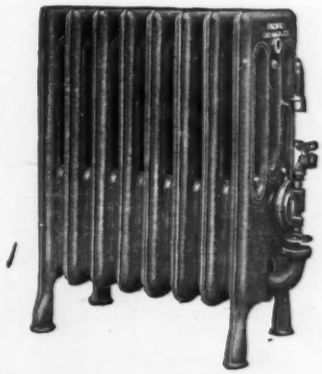
The Multi-Tubular Burner

Each burner has its independent injection of gas. Primary air for combustion is directly siphoned at each burner. There is no need for adjusting of the gas and air for combustion, as this new Pacific Burner is scientifically designed to automatically give the correct proportion of air to gas. This results in complete combustion and a high temperature flame of proven economy. No soot. No odors.

Gas Steam Radiators

The Pacific Unvented Gas Steam Radiators are now available in four column pattern. A size for every demand, 26, 32, and 38 inches high. The Pacific Gas Steam Radiators are approved by both the American Gas Association Laboratory and the Underwriters Laboratories.

Our agency proposition is very attractive—write for particulars concerning your locality.



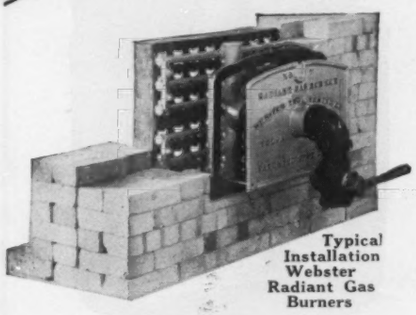
Get in on Every Heating Job in Your Territory

Pacific Gas Radiator
Gas Heating Company Headquarters

Manufacturers of Every Type of Gas Heating Appliances

Roseberry and Walter Streets, Huntington Park, California

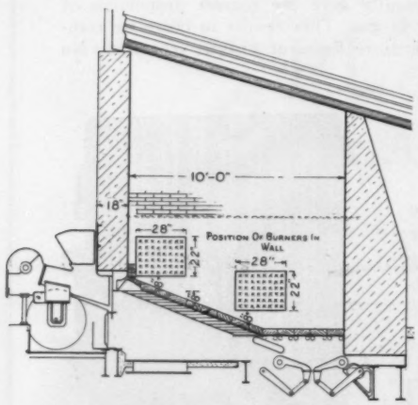
WEBSTER RADIANT GAS BURNERS for POWER BOILERS



Typical Installation Webster Radiant Gas Burners

WEBSTER Radiant Gas Burners are daily demonstrating their adaptability to the firing of all kinds of power boilers. These burners, ranging in capacities from 30 H.P. to 330 H.P. per burner, offer economies in fuel, advantages in flexibility and a unique ability to meet emergency overload and operate at high ratings without "puffing" or "vibrating."

The power generation field is an attractive source of gas load—Webster Burners will help you get it—and we are here to assist you with advice, service and sales aid.



Webster Radiant Gas Burners installed over stoker grates in 700 H. P. boiler.

WEBSTER ENGINEERING COMPANY
Tulsa, Okla.
DIVISION OF
The Surface Combustion Co. Inc.

Main office of Fluor Corporation Ltd. at Los Angeles, showing additional story.

Fluor Corporation, Ltd., Adds to Facilities

THE Fluor Corporation, Ltd., announces additions to its manufacturing plant and office building. With this announcement also comes the news of the change in name from Fluor Construction Company. No change in management or executive personnel of the company has been made, according to P. E. Fluor, general manager.

On a site in Anaheim, California, recently purchased by the company, complete offices, small parts store room, garages, machinery, storage warehouses and other buildings, covering approximately two acres, have been erected. This division will hereafter handle labor distribution for all jobs under construction, and serve as a storage depot for construction machinery and supplies, as well as a base for the company's fleet of trucks. Approximately 200 men are employed in this division.

Illustration shows the main office, located at 909 East 59th Street, Los Angeles, California, with the addition of a second story to the structure. All departments of the headquarters division, including engineering, design, and manufacturing, are now located in this building. The original cooling tower manufacturing plant, directly behind the main office building, will remain in its present location.

The Fluor Corporation, Ltd., recently completed a cooling tower for the Texas Company at the company's refinery at Watson, Calif. The tower is 18 feet wide by 47 feet high by 840 feet long.

Another installation of interest in the construction line now under way is a seven-unit high-pressure compressor station for the Barnsdall Oil Company of California in the Elwood, California, field. The company also is building a four-unit high-pressure compressor station for the Superior Oil Company at Santa Fe Springs.

J. C. BOYLE NEW ASSISTANT GEN. MANAGER FOR COPCO.

According to an announcement made by C. M. Brewer, vice-president of the California Oregon Power Company, J. C. Boyle has been named assistant general manager of the company. Announcement has also been made by Mr. Brewer that H. P. Bosworth, assistant secretary of the company, has been appointed manager of the Klamath Division to succeed Mr. Boyle.

Mr. Boyle has been in the service of The California Oregon Power Company for nearly 20 years. He became affiliated with the company in May, 1910, just after his graduation from the University of California, where he majored in civil engineering.

F. P. BOOK ASKS FOR LEWISTOWN, MONTANA, FRANCHISE

The Northern States Oil Company, represented by Frank P. Book of Detroit, has asked for a permit to serve Lewistown, Montana with gas. Source of the supply was not specified.

HANLON-WATERS, INC., TO HANDLE OIL FIELD SALES

On November 1 Hanlon-Waters, Inc., of Tulsa, a newly organized company, will take over the oil field sales of products manufactured by Fisher Governor Co., Victaulic Company of America and the Reed Air Filter Company. E. I. Hanlon is chairman of the board of the company, M. F. Waters is president, D. E. Buchanan, vice-president and J. H. Boyle, secretary-treasurer.

HEARING ON COAST COUNTIES APPLICATION, NOV. 26

At the request of the Coast Counties Gas & Electric Company the Railroad Commission of California on October 17 agreed to set ahead until November 26, their hearing on this utility's application for a certificate of public convenience and necessity to construct a natural gas transmission line from the Kettleman Hills oil fields to the Coast Counties Gas & Electric Company's territory.

Why do gas companies . . . . standardize . . . . on Minneapolis-Honeywell House Heating Controls?

Engineering leadership of the Series 10 and Series 20 circuits becomes more evident as house heating experience grows. The safety, accuracy, superiority, and complete dependability of Minneapolis-Honeywell controls and Erickson Gas-o-trols have been indisputably demonstrated through years of unfailing service. These features, together with low installation cost and unusual freedom from service, fulfill all requirements of the most exacting engineers.

Sales-making advantages inherent in the Minneapolis-Honeywell line, because of years of national advertising and the resulting public faith in the products of this company, are reason enough, say some gas company executives, why house heating installations should be equipped with Minneapolis-Honeywell units.

The nation-wide service organization maintained by Minneapolis-Honeywell cooperates most thoroughly with gas companies. Sales engineers and service men are ready in every part of the country to help you with any control problem you may encounter.

Dollars-and-cents profit in standardization is an advantage that carries greater weight with each new installation. Smaller stocks can be carried. The service department cuts costs by avoiding the waste due to incomplete knowledge of a multiplicity of systems.

Are you thoroughly familiar with the complete line of Minneapolis-Honeywell automatic controls for gas-fired heating plants? Write today for detailed information.

ARTHUR F. ERICKSON COMPANY

Pacific Coast Distributors

557 Market Street
SAN FRANCISCO, CAL.

Selling Building
PORTLAND, OREGON

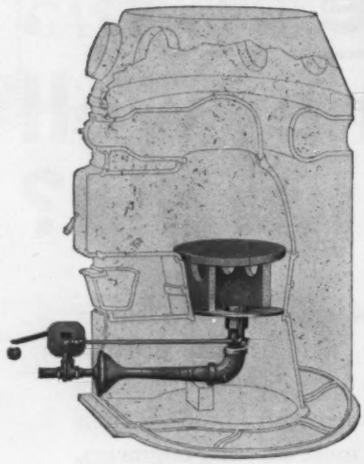
Terminal Sales Building
SEATTLE, WASH.

MINNEAPOLIS
HEAT REGULATOR
HONEYWELL

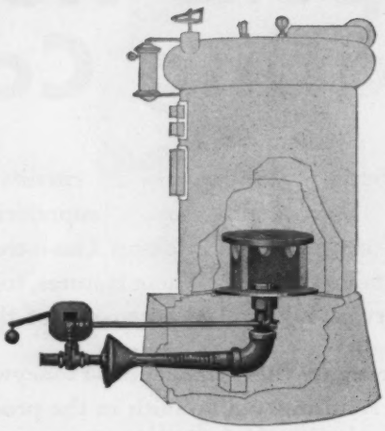
Clock control makes gas heating completely automatic. Sell your customers this equipment so that they may enjoy all the benefits of gas heat.

MAXON

Conversion Gas Burners



The above is an application to a warm air furnace. The burner is easily installed and the unit is fool-proof, making it a very dependable conversion unit for gas companies to recommend and sell.



This is an application to a round boiler. The burner is equipped with a snap-acting valve which can be attached to the existing furnace chain and manually controlled from upstairs. Either automatic or hand-controlled is recommended.

Pacific Coast Representative

The T. G. ARROWSMITH CO.

661 Howard St.

San Francisco, Calif.

MAXON PREMIX BURNER CO.

INDUSTRIAL FUEL BURNING EQUIPMENT — FOR OIL OR GAS, OR BOTH COMBINED

MUNCIE — MAXON PREMIX BURNER — INDIANA

Reynolds Gas Control Since 1892

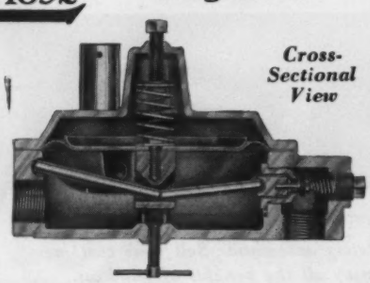
Reynolds Little Giant Regulator

Products for all kinds of Pressure Reduction—for either artificial or natural gas.

GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.

REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.

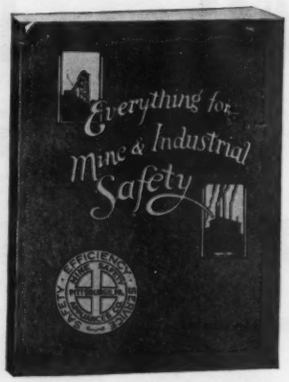
VALVE—Automatic Quick Closing Anti Vacuum.



Cross-Sectional View

Reynolds Gas Regulator Company

Anderson, Indiana



MINE SAFETY APPLIANCES CO.'S NEW CATALOGUE READY

Mine Safety Appliances Company of Pittsburgh, Pennsylvania, has issued a new general catalogue, No. 4, of 160 pages covering the company's line of appliances. The new catalogue contains a number of illustrations, many of which are reproduced in colors. Copies may be had by sending a request to the company's advertising department.

SERVEL, INC., BUYS SWEDISH ELECTROLUX PATENTS

Colonel Frank E. Smith, president of Servel, Inc., has announced that the company has purchased the entire Swedish interests in patent rights to the Electrolux absorption refrigerator in the United States, its possessions, and Cuba ond Canada. Colonel Smith's statement mentions the calling of a special stockholders meeting to authorize an increase in common stock from 1,600,000 to 2,000,000 common shares, with which the company will retire notes given to the Swedish interests under a conversion arrangement.

SHARPLES PORTABLE CLEANER FOR OIL IS NEW PRODUCT

A portable combination centrifuge and filter press has been placed on the market through the Westinghouse Electric and Manufacturing Company. A Sharples supercentrifuge is combined with a Westinghouse filter press equipment and mounted on a truck. The new portable equipment will clean 1200 gallons of oil per hour, occupies a space 54 inches by 106 inches, and can be moved from place to place.

LAS ANIMAS LINE TO BE BUILT BY S. W. CONSTRUCTION CO.

The Southwestern Construction Company of Tulsa, Oklahoma, has been awarded the contract for the construction of a natural gas pipe line to extend from La Junta, Colorado, to Las Animas and the government hospital at Fort Lyon, Colorado. The gas is to be supplied from the Amarillo-Denver transmission line.

U. G. I. TO MAKE INSTALLATION AT CRESTON, IOWA

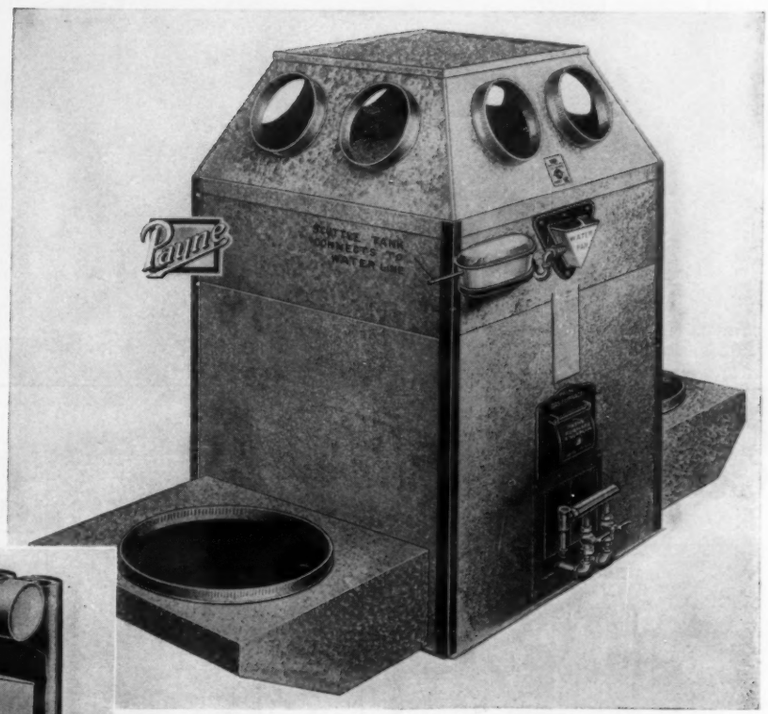
The Central States Electric Company of Cedar Rapids, Iowa, has purchased from The U. G. I. Contracting Company division of United Engineers & Constructors Inc., for its Creston, Iowa, gas plant, materials for the installation of Chrisman Cycle for one of their sets.

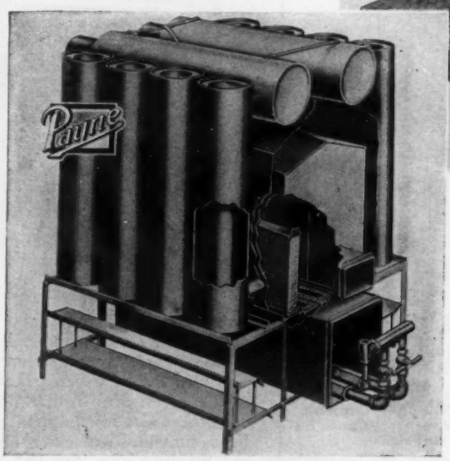
Push a button! Set a clock! Heat this simple scientific way! No dust! No ash!

PAYNE

Central Furnace

Gas Heating in its simplest and most economical form! Easy to install, economical to operate. Correct design provides uniform winter heating, convenient control (push button or thermostat) and automatic humidifying for dry climate if desired.





Here is a high efficiency gas-fired furnace for reducing the cost of your warm air heating installation — made by the world's largest manufacturers of gas furnaces exclusively. Approved by A. G. A. Testing Laboratories. Write for new Bulletin 6-B — just out!

PAYNE FURNACE & SUPPLY CO., INC.

BEVERLY HILLS, CALIFORNIA

Payne Heat

Unit Furnaces
Floor Furnaces
Central Furnaces
Industrial Installations
Pipeless Wall Units
Factory Units

Payne Engineering Service

Architects, Building Contractors and Heating Engineers are invited to put their troublesome warm air heating problems up to Payne Engineers. Send floor plans and full details of heating requirements. No matter how large or how small your installation may be, the Payne Furnace & Supply Co., Inc., is ready to cooperate with you.

Payne

THERE IS A "PAYNE HEAT" SYSTEM FOR EVERY BUILDING AND CLIMATE

An Automatic Water Heater In Every Home

The TROOPER Automatic Storage Heater

will enable you to bring this about.

It can be sold to your customers for as low as **$55.00,** with a fine profit for yourself. Its low price will attract customers and its high quality will make the sale.

Notice these features never before offered in a low-priced storage heater:

Heavy COP-R-LOY Tank,

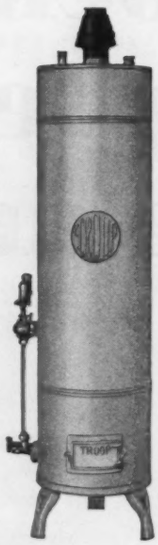
Automatic Safety Pilot,

Guaranteed accurate Thermostat,

Heavy Insulation,

Brass Water Connections,

Ivory Enamel Finish



TROOP WATER HEATER COMPANY

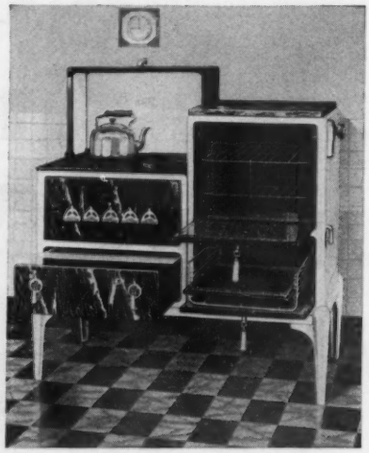
Pittsburgh, Pa.

Southern Office & Warehouse,
2625 Elm St., Dallas, Texas.

Branches in all Principal Cities.

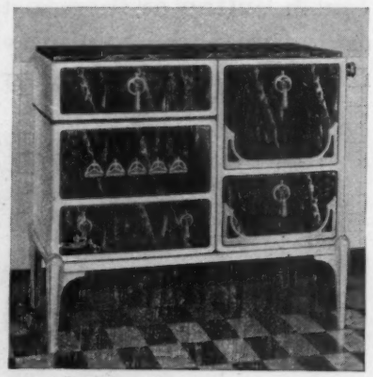
"MAGIC CHEF" MAKES INITIAL BOW TO THE INDUSTRY

The American Stove Company of St. Louis, Missouri, in introducing its new gas range, called the "Magic Chef," to the industry, issued an attractive brochure 11½ inches by

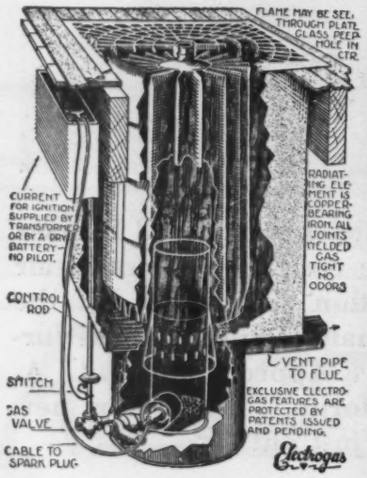


14 inches, containing 100 pages of descriptive material with illustrations in color halftones.

The new models represent a radical departure in style, featuring a cooking top cover, spring balanced, with pipes, gas valves, bolts and manifold completely concealed. The top burners of vertical injection type have removable heads and each may be used as a simmering or giant burner. The service drawer is mounted on rollers. Handles are of green bakelite with brass fittings. Oven and broiler doors are insulated, and the oven is equipped with an automatic heat control. An extension carriage brings the broiling pan into full view.



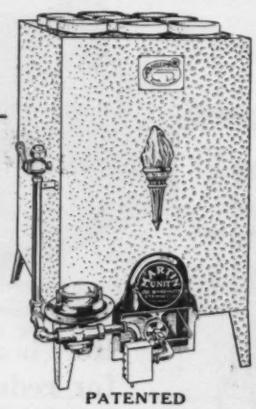
Electrogas


FLAME MAY BE SEEN THROUGH PLATE GLASS PEEP HOLE IN CTR.
RADIATING ELEMENT IS COPPER-BEARING IRON. ALL JOINTS WELDED GAS TIGHT NO ODORS
CURRENT FOR IGNITION SUPPLIED BY TRANSFORMER OR BY A DRY BATTERY—NO PILOT.
CONTROL ROD
SWITCH
GAS VALVE
CABLE TO SPARK PLUG
VENT PIPE TO FLUE
EXCLUSIVE ELECTRO-GAS FEATURES ARE PROTECTED BY PATENTS ISSUED AND PENDING.
Electrogas

—The Officers' Quarters, San Francisco Presidio, are heated by these remarkable floor furnaces.

Manufactured in San Francisco

Electrogas



PATENTED

Martin Unit Gas Furnaces

ARE THE RESULT OF 38 YEARS HEATING EXPERIENCE

MADE IN FOUR SIZES

Electric, Thermostat or Manual Control Approved by A. G. A. Laboratory and by the City of Los Angeles

Write for your copy of "Modern Heating Methods"

PHILLIPS HEATING, VENTILATING & MFG. CO.

1710 W. Washington St.
Los Angeles, California

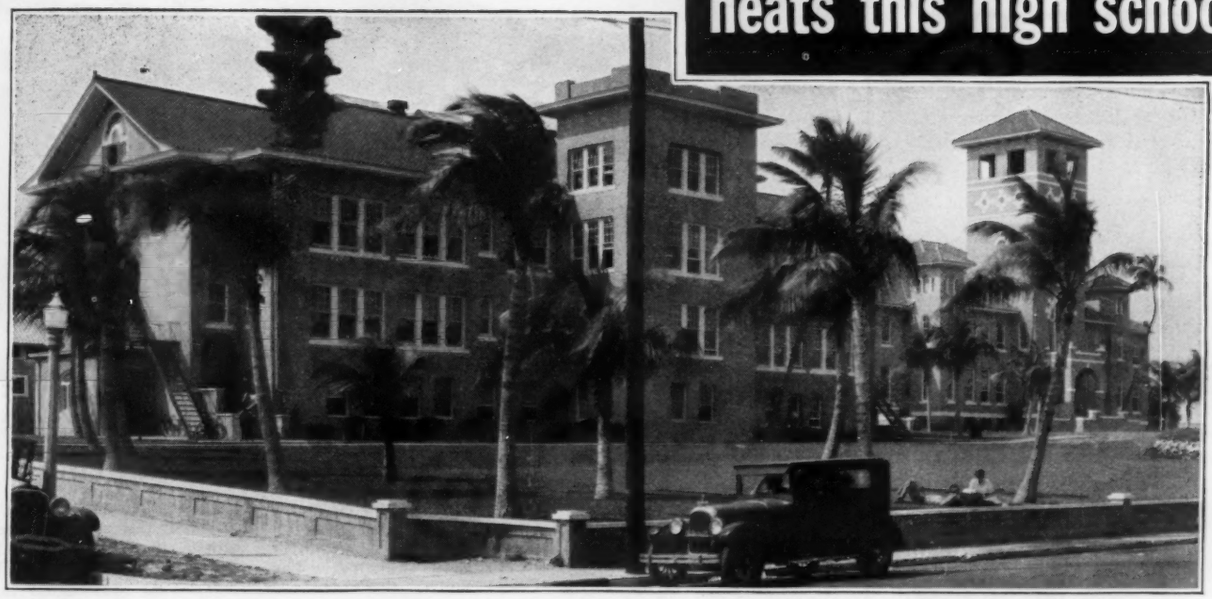
Live Agents Wanted

TESTING LABORATORY A.G.A. APPROVED

NINTH ANNUAL METER SHORT COURSE, DECEMBER 3-6

The Ninth Annual Gas Meter Short Course, sponsored by the Mid-West Gas Association and the Engineering Extension Service of Iowa State College, will be held December 3-6 at Ames, Iowa. The entire four days will be devoted to intensive study under expert supervision, and timely questions pertaining to gas metering will be discussed in detail.

9.1 cents per foot of radiation per year heats this high school



Central Group High Schools, West Palm Beach, Florida
Architect, King & Campbell *Heating Contractor, E. C. Hilker, Inc.*

One of the Many Leading Schools . . . Clow Gasteam Equipped

Clow Gasteam Radiators are providing a faster, cleaner, more flexible heating system for the Central Group High Schools, West Palm Beach, Fla.

14,000 square feet of radiation is installed. The gas rate is $2.50 per M (Mfg. Gas)—and the net gas bill for the 12 month season just completed totals only $1,280.00—or 9.1 cents per square foot of radiation for the year.

Each Clow Gasteam Radiator makes its own steam heat and is operated independently of all others. Clow Gasteam operates without the need for basement or expensive piping system—or the attention of a fireman. Lap jointed combustion chamber (an exclusive Clow feature) completely eliminates all fire hazard.

Used for the smallest room or the largest buildings—in climates of all kinds. Write today for illustrated book giving a simplified B. T. U. method of calculating steam radiation.

JAMES B. CLOW & SONS 201-299 North Talman Avenue, Chicago

CLOW GASTEAM

A.G.A. Approved. Listed and Inspected by Underwriters' Laboratories

STOCKED IN EVERY SECTION OF THE COUNTRY

GAS or WATER Connections

whether screw thread or gasket, should be made up with KEY TITE PIPE JOINT COMPOUND.

KEY TITE PIPE JOINT COMPOUND is not a quick hardening cement, but a plastic lubricant and a filler that will seal the most obstinate joint with ease. It covers more surface than an equal volume of red or white lead, thereby reducing the cost. It is waterproof—and there is no waste.

Manufactured by

E. A. Key Co., Inc.

2814 Santa Fe Ave.
Los Angeles, Calif.

Distributors in all principal cities.

WRITE FOR FREE SAMPLE

Payne overhead unit installed in plant of Hughes Tool Company, Los Angeles, Calif.

Payne Furnace *and* Supply Offers Industrial Unit

PAYNE Furnace and Supply Company of Beverly Hills, California, has recently placed on the market a new industrial heater—an overhead installation for factories, shops, warehouses, lofts and auditoriums. It is supported from the roof or super structure, and may be installed without interfering with shop production and without change in floor arrangement. Burnt gasses are piped out of doors through a vent, and fresh air passing through the furnace is propelled by an electric fan which directs the air current down over the area to be heated. The manufacturer states that the individual furnaces are so constructed that all or part of the air passing through the furnaces can either be re-circulated or drawn in from outdoors. These furnaces are also equipped with electric push-button controls.

MINNESOTA-NORTHERN TO BUILD TWO MONTANA-DAKOTA LINES

Following the visit to Eastern Montana, early in October, of officials of the Minnesota-Northern Power Company, and its subsidiary company, the Montana-Dakota Power Company, announcement was made that construction work will start early in the spring on the line from the Glendive structure in Eastern Montana to Williston, North Dakota, and on a line to Bismark, North Dakota. The line to Williston will be approximately 90 miles long and will serve Stipek, Intake, Burns, Crane, Savage, Sidney and Fairview, all in Montana.

The line to Bismark will be 210 miles long, and will serve Wilbaux and Carlyle, Montana, and Golva, Beach, Sentinel Butte, Richardton, Hebron, Glen Ullin, Mandan and Bismark, North Dakota. It is reported that franchise activity and surveys will occupy the winter months, and that actual work on the new pipe lines will start as soon as the frost leaves the ground.

JACK HOLT RETURNS TO H. R. BASFORD CO.

Jack Holt, gas appliance man of long experience, has returned to the H. R. Basford organization, where he was employed some years ago. He will call on the trade in Northern and Central California.

B. C. ELECTRIC RY. CO. FINISHES NEW HOLDER AT VANCOUVER

Erection of the new 3,000,000 cubic-foot gas holder of the British Columbia Electric Railway Company, Ltd., at Vancouver, B. C., has now been completed, and painters are putting final touches to the huge cylinder. This holder is of the waterless type, and cost $300,000 to build. An additional $2,500 was spent on painting and decorating with Neon signs.

The structure was first given a priming coat of flat gray paint, and now the final coat of aluminum paint is being sprayed on. When the painting is completed the words "Gas—The Modern Fuel" will be painted on the sides of the holder in 20-foot letters. This wording will be repeated three times in order to completely encircle the cylinder.

Neon tubing will be used to outline the word "Gas," while "The Modern Fuel" will be illuminated by a battery of floodlights. These floodlights will also make the aluminum painted surface of the holder visible at night for a long distance.

PIEDMONT, MISSOURI, TO HAVE NATURAL SUPPLY

Piedmont, Missouri, has granted to John J. Ward of St. Louis, and W. D. McGhee of Piedmont, permit to serve natural gas in that town.

ACCEPTANCE!

ACCEPTANCE!

ACCEPTANCE!

MOORE'S *Seventeen* PURITAN

"The Heater That Speaks for Itself"

is already one of the chief articles of merchandise on the sales-room floors of many of the world's largest distributors of gas.

These companies are now putting thousands of MOORE'S **Seventeen** PURITANS in homes, offices and shops, while at the same time creating goodwill and earning merchandising profit for themselves. This within less than two years from the time the first MOORE'S **Seventeen** PURITAN was offered to the trade.

A G A
APPROVED
Fully covered by Patents
and Patents Pending

THREE SIZES

Normal input ratings:

105,000 B.T.U.'s per hour.
70,000 B.T.U.'s per hour.
35,000 B.T.U.'s per hour.

THREE FINISHES

Two-Tone Walnut } **porcelain**
Mahogany } **enamel**
Velvo-Black

SAFETY FEATURES

The safety features of MOORE'S *Seventeen* PURITAN exceed those of any other gas fired heater now on the market.

MEETS EVERY HEATING REQUIREMENT

It Takes More Than a Flame and a Casing to Make a Successful Circulating Gas Fired Heater

MOORE BROTHERS COMPANY

JOLIET, ILLINOIS

SINCE 1857

Re-Chrome Meter Leather

Re-Chrome Meter Diaphragm

BESSE, OSBORN & ODELL INC. · BOSTON, U.S.A. · COLONIAL BRAND RE-CHROME METER LEATHER

"Colonial" Brand

Made from choice New Zealand Lamb skins selected and tanned with the greatest care. Diaphragms made from this leather have the following advantages:—

Longer years service—More accurate measurement of gas—More impervious to water—Greater resistance to heat and climatic changes — Stronger fibre—Absorbs more oil—More Flexible—Eliminates "floppy" diaphragms.

Besse, Osborn & Odell, Inc.

51 South St., Boston **177 William St., New York**

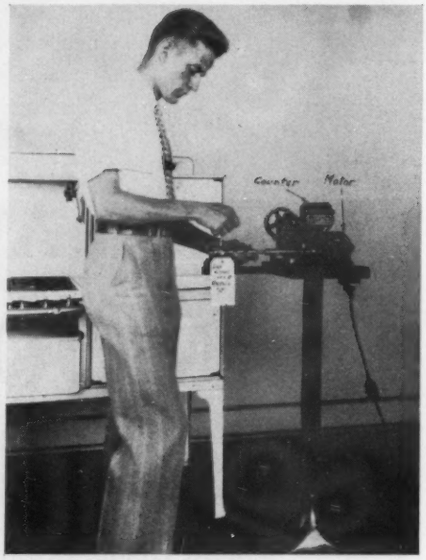


Fig. 1. Installing a gas cock on testing machine to determine the value of a special grease.

Gas Cock Testing

THE AMERICAN STOVE COMPANY Research Laboratory has forwarded "Western Gas" some interesting information on the testing of gas cocks, which we summarize below.—EDITOR.

COMPOSITION of the brass used in the manufacturing of cocks and workmanship entering into these essential parts of gas appliances must be such that, after years of usage, they will still be gas-tight. If the workmanship is poor, leaks will develop. If the lubricant is improper, the cock will bind, or stick, after a few years of use.

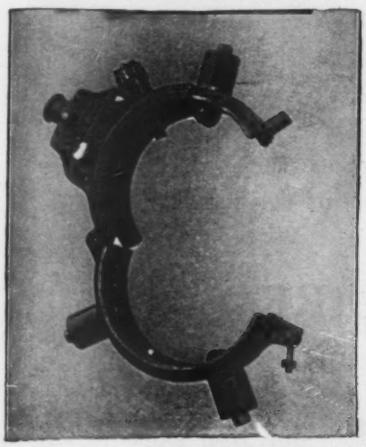
On some appliances, the gas cocks become quite hot from the heat of the burner. Proper lubrication is necessary, therefore, to keep the cocks from binding under any condition of service.

To test the gas cocks manufactured by the American Stove Company for proper design and durability in use, M. A. Possons, manager of the New Process Stove Company Division, designed and built two special machines. One of these is in use at the factories of the New Process Stove Company; the other is used at the Research Laboratory of the American Stove Company.

The machine is shown in Fig. 1. Its mechanism is very simple, the actuating force being supplied by a small motor. The motor is connected to a reduction gear, which, by means of an eccentric, turns a shaft back and forth about 50 times a minute through an angle of 90 degrees. There is a counting device which records the number of times the gas cock is turned "on" and "off."

The cock to be tested is clamped to the frame of the machine. The key, or movable part of the cock, is bolted to the shaft. Thus, a cock on this machine will be turned "on" and "off" about 50 times a minute and will receive as much usage in an hour as it would normally get over a period of about three years on the average gas range.

As was stated before, to give satisfactory service a gas cock lubricant must retain its lubricating quality at all temperatures to



The STRICKLER

Ratchet Pipe Cutter

The STRICKLER Ratchet Pipe Cutter automatically cuts cast iron, steel and wrought iron pipe (from 1½ to 30" in diameter) by hand (either in the trench or in the shop).

You can cut any pipe from any position easily. Simply pump the handle and the STRICKLER does the rest. Order your STRICKLER Now

W. W. STRICKLER & BROS.

1475 Oak Street **Columbus, Ohio**

California Oxide

GAS Purification Requirements can be most efficiently cared for through the additional and improved facilities of our new plant in Southgate.

Both Maas and McKee Oxides have met gas purification requirements of the Pacific Coast over a period of several years and merit your investigation.

California Oxide Co.

308 East Eighth Street

Los Angeles

TRinity 0769

which it may be subjected. If the lubricant fails, the cock binds, or sticks. The testing machine is used to test cocks at different temperatures, being designed so that the cock can be inserted into a heated oven while undergoing testing.

Many of the cocks under test are turned "on" and "off" over 100,000 times without failure, which corresponds to about 75 years of normal use. The tests show that gas cocks properly designed and lubricated should last indefinitely.

CITIES SERVICE COMPANY ISSUES RIGHTS TO STOCKHOLDERS

Directors of the Cities Service Company in October announced purchase rights of holders of common stock of one share at $45.00 for every 10 shares held. These rights will be issued to registered holders at the close of business on November 7, 1929, and must be exercised on or before November 30, 1929. The company has more than 235,000 common stockholders, this being an increase of 100,000 during 1929.

The Cities Service organization is made up of more than 100 subsidiary companies operating in the public utility, petroleum and natural gas industries.

The net earnings of the company for September were $3,665,827.44, which is a new high mark for any month.

MISSISSIPPI RIVER FUEL CO.'S LINE TO ST. LOUIS READY

Announcement has been made of the completion of the Mississippi River Fuel Corporation's industrial gas line from Monroe, Louisiana, to St. Louis, Missouri. The line is now being tested and gas will be supplied to St. Louis industrial users about the first of November.

Ford, Bacon & Davis had the general contract for the line with Williams Brothers, Inc., and the Oklahoma Contracting Company as sub-contractors.

Interests behind the project are the Standard Oil Company of New Jersey, the Electric Bond & Share Company and others.

DUPLEX GAS-FIRED EQUIPMENT NOW SOLD BY ROBERTS-GORDON

The sales and distribution organization of the Roberts-Gordon Appliance Corporation has taken over the selling activity connected with the products of the Duplex Heating Company. Headquarters for the company are at Buffalo, New York.

The Duplex line consists of straight gas-fired equipment, including units for private homes, apartment houses, hotels, office and other business buildings, garages and industrial plants.

R. D. GWYNNE TO MANAGE AMERE GAS UTILITIES CO.

R. D. Gwynne, formerly manager of the Oklahoma and Kansas district office of Jos. Greenspon's Sons Iron & Steel Company, at Tulsa, has been appointed general manager of the Amere Gas Utilities Company of St. Louis. This company is a subsidiary of the steel company. C. C. Hurlburt has been chosen to succeed Mr. Gwynne as district manager of the steel company at Tulsa.

G. G. FARLEY APPLIES FOR PERMIT IN VIAN, OKLAHOMA

G. G. Farley, representing the Oil and Gas Company, has asked for a franchise for the service of natural gas in the city of Vian, Oklahoma.

The BARTLETT HAYWARD CO.

BALTIMORE *Engineers and Founders* NEW YORK

DESIGNERS AND BUILDERS
– OF –
COMPLETE COAL GAS PLANTS
CARBURETTED WATER GAS PLANTS
BY-PRODUCT PLANTS
DE BROUWER CHARGING AND DISCHARGING MACHINES
SALT WATER AND FRESH WATER CONDENSERS
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SHAVING SCRUBBERS
CENTRIFUGAL VERTICAL TYPE SCRUBBERS
STEEL TANKS
VERTICAL WASTE HEAT BOILERS

GAS HOLDERS

IMUNOL

THE Protective Paint for Water Seal Gas Holders

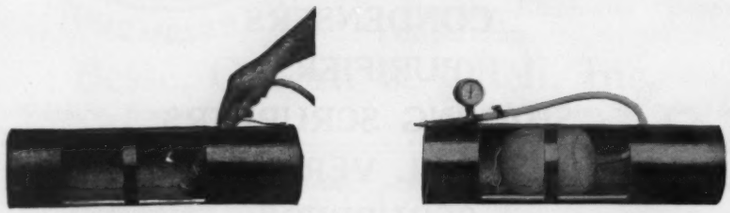
Imunol is a non-drying, self-applying paint that eliminates corrosion—inside and out.

B. W. Mueller—447 Sutter St.—San Francisco
Pacific Coast Representative
Inertol Co., Inc.—New York City—Manufacturers

Pipe Stoppers

2" TO 48"

Dependable Gas Main Bags



FOLD it and WRAP it and DROP it in PLACE

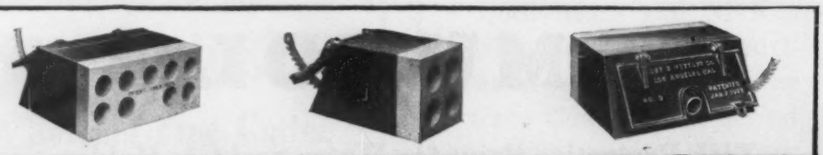
OUR PUMP WILL BREAK THE CORD

TYPE "C"

Type C—Canvas-covered, for use where plain rubber will not last. TREATED FOR USE IN OIL LINES while welding is being done.

Safety Gas Main Stopper Company

523 Atlantic Avenue, Brooklyn, N. Y.
Cable Address: Gastopper, N. Y.
Pacific Coast Representative: C. B. Babcock Co., San Francisco, California



Mettler Entrained Combustion Gas Burners

FOR ALL Purposes Kinds of gas Pressures

406 S. Main St. **LEE B. METTLER. CO.** Los Angeles Cal.

SALT LAKE NEWSPAPER ISSUES NATURAL GAS EDITION

The entire September 29 issue of the Salt Lake Telegram of Salt Lake City, Utah, was devoted to the story of the coming of natural gas to Utah, in honor of the completion of the Western Public Service Corporation's line from Baxter Basin in Wyoming to Salt Lake City and other centers in Utah.

Articles by various public utility officials were featured, including "Natural Gas Company Overcame Numerous Problems in Service" by Jules D. Roberts, operating vice-president of the Utah Gas and Coke Company and the Ogden Gas Company; "The Story of the Advent of Natural Gas to Utah" by L. Fitzpatrick, vice-president and general manager of the Utah Gas and Coke Company, the Ogden Gas Company, and the Wasatch Gas Company; and "Model Home in Salt Lake Using Gas for All Heat Needs," by L. D. Simmons. E. O. Howard, president of the Salt Lake Chamber of Commerce, contributed an article, welcoming the new fuel as a significant force in future industrial development.

GAS PLANT AT LEWISTON, IDAHO, SOON TO BE COMPLETED

Construction of the new gas plant at Lewiston, Idaho, by the Northwest Cities Gas Company is rapidly nearing completion, according to word received from T. L. Cross, district manager for the company.

The new building is of brick and steel, and covers an area of 150 by 76 feet. Cost of the building alone will be approximately $30,000. Equipment will be installed by the Gas Machinery Company, and consists of a 5-foot water gas set with the necessary equipment for operating it. The new plant will have a capacity of 15,000 to 20,000 cubic feet per hour. In addition to the plant, a relief holder of 35,000 cubic feet capacity will be constructed.

O. F. ANDERSON AND A. R. BAILEY ASSIST IN CHANGE-OVER

O. F. Anderson and Al R. Bailey of the Los Angeles Gas and Electric Corporation of Los Angeles, California, are at the present time in the territory of the Coast Counties Gas & Electric Company, assisting the latter utility in building up the crews necessary for the change-over from manufactured gas to straight natural gas. The Northern Division, embracing Contra Costa County, will be the first territory to be affected.

WALTER REID GETS $500, GIFT FROM GASOLINE ASSN.

Walter Reid of Dallas, Texas, was recently the recipient of a present of $500 in cash from the Natural Gasoline Association of America. The money was given in appreciation of his services to the industry in developing the Reid vapor pressure testing method. This method recently was approved by the Interstate Commerce Commission and has been adopted by the Association.

JACKSON ENGINEERING CORP. OPENS HOUSTON, TEXAS, OFFICE

Jackson Engineering Corporation announces the opening of district offices in the Second National Bank Building, Houston, Texas, under the management of E. J. Hudson. Jackson Engineering Corporation represents Heat Transfer Products, Inc., and Fluor Corporation, Ltd.

New Service Trucks *for* Gas Distribution Dept.

SAN Diego Consolidated Gas and Electric Company, of San Diego, California, has added two new service trucks to the Gas Distribution Department's equipment. One is to be assigned to the National City-Chula Vista district and the other to the Point Loma-La Jolla district. The trucks have several new features.

Compartments are provided in the sides for storing miscellaneous fittings and material and small hand tools. Space beneath the bed is utilized for carrying picks, shovel, tampers, axes, digging bars, etc. Pipe is transported in full lengths in the open space on each side of the bed below the fitting boxes. Bulky material, such as tar buckets, lanterns, felt paper, etc., is stored in the boxes beneath the seats on the bed.

Oxygen, acetylene and city gas cylinders for welding and brazing are mounted in an iron frame back of the cab. Hose, rope and wire are carried in coils on the frame work supporting the canvas tops. Water bags are suspended from this frame work with a drip pan and pipe beneath the bags to carry the drippage over the side.

The covers of the tool and material boxes form seats on which the men ride in comfort and safety to and from jobs. Sufficient space is available on the beds of the trucks between the seats for hauling special equipment, such as welding carts and small air compressors, whenever required.

CONNERSVILLE BLOWER CO. ISSUES NEW BULLETIN FOR THE TRADE

Connersville Blower Company has issued a new bulletin styled No. 110, describing the "R-S" and "R-B" series of Connersville rotary positive blowers designed for the medium range of air volumes and pressures.

"R-S" series includes blowers fitted with renewable, split sleeve, babbitt lined, heavy duty bearings.

"R-B" series are machine fitted with roller bearings.

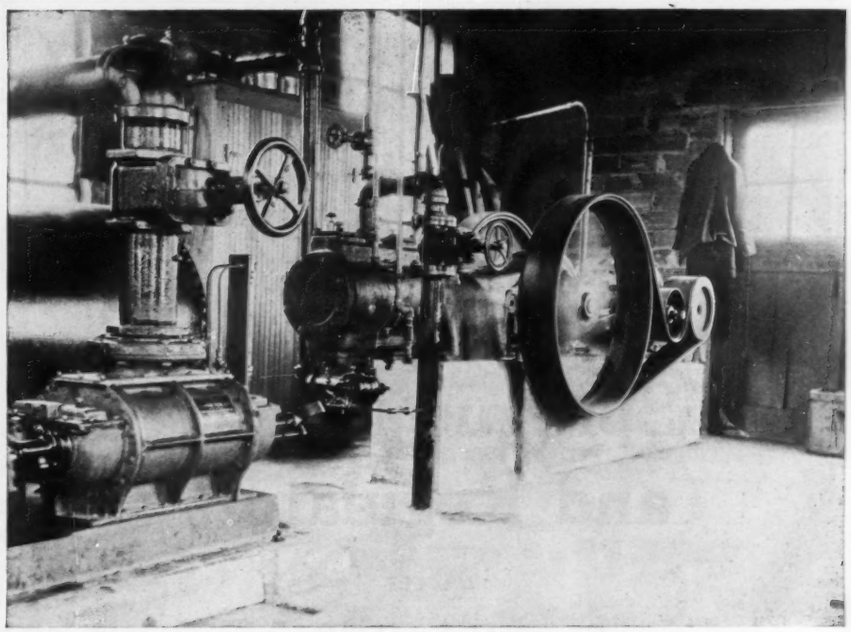
In addition to the description of the general operating characteristics of the blowers and some of the features of design, the bulletin contains revised ratings based on the improvements in blower construction, which permit higher operating speeds.

Another bulletin which the same company has published is styled No. 201, and describes Connersville rotary gas exhausters for service in gas plants, by-product coke plants, oil refineries, chemical manufacturing industries, and other processes. This bulletin contains a description of the general operating principle of Connersville exhausters and of different bearing construction features with illustrations of the different types and arrangements of these exhausters.

Bulletin 305, also recently published by the Connersville Company, illustrates the different installations of the Connersville patented rotary displacement meters for measurement in manufacturing, distribution and industrial consumer installations.

ERNEST JONES NAMED GEN'L MGR. FOR SMITH-LANDERYOU

Ernest G. Jones has been named general manager of the Smith-Landeryou Company's utility properties in Wyoming and Colorado. Mr. Jones was formerly manager of the Canon City Gas Company, of Canon City, Colorado. Headquarters for the Smith-Landeryou Company are maintained in Omaha, Nebraska.



You can safely place Connersville Meters on the inlet side of a compressor

The sturdy, iron and steel construction of the patented Connersville Meters permits their use on the inlet line of air or gas compressors. Rotating displacement assures dependable accurate measurement—a combination of characteristics which brings satisfactory meter service.

The Connersville Blower Company

Michigan Ave. at 16th St.

Connersville, Indiana

CONNERSVILLE

Blowers-Gas Pumps-Meters-Cycloidal Pumps

Sprague Semi-Chrome Leather

Resists Acids
and Boiling Water

Now Used in All

Sprague Meters and Regulators

After

Five Years' Tests and Experiments

May we send you samples and data

The Sprague Meter Co.

BRIDGEPORT, CONN.

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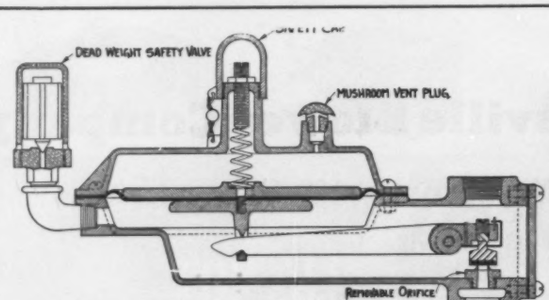
Newark, Ohio

Davenport, Iowa Houston, Texas



PRESSURE REGULATION FOR ALL REQUIREMENTS

REPRESENTATIVES:

Seidenglanz & Co., Santa Fe Building, Dallas.
Midland Supply Co., Dwight Building, Kansas City.

GROBLE GAS REGULATOR COMPANY, Anderson, Ind.

MERGER OF TWO PUBLIC UTILITIES IS PROPOSED

Announcement has been made of the proposed merger of the National Gas & Power Corporation, headed by Fred W. Seymour, president of the Minneapolis Gas Light Company, and the American Commonwealth Power Corporation. According to John K. Swanson, vice-president and general manager of the Minneapolis company, $3,500,000 has been offered for the holdings of the National Gas & Power Corporation by the American Commonwealth.

CLEVELAND GAS BURNER CO. HAS NEW CONVERSION BURNERS

The Cleveland Gas Burner and Appliance Company of Cleveland, Ohio, has brought out a new line of Barber automatic conversion gas burners for round boilers and furnaces, and has issued a pamphlet describing the new line. Copies may be had by sending a request to the company.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC.,

Required by the Act of Congress of August 24, 1912, of *Western Gas*, published monthly at Los Angeles, California, for October 1, 1929.

State of California,
County of Los Angeles—ss.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared Jay Jenkins, who, having been duly sworn according to law deposes and says that he is the Publisher of the *Western Gas* and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Jay Jenkins, Los Angeles, California.

Editor—None.

Managing Editor—George H. Finley, Los Angeles, California.

Business Managers—None.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Western Business Papers, Inc., Los Angeles, Calif.
Jay E. Jenkins, Los Angeles, Calif.
James E. Jenkins, Los Angeles, Calif.
George H. Finley, Los Angeles, Calif.
H. Elliott Taylor, San Francisco, Calif.
Craig Espy, Dallas, Texas.

3. That the known bondholders, mortgagees, and other security holders owing or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner, and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is.....
(This information is required from daily publications only.)

JAY JENKINS, Publisher.

Sworn to and subscribed before me this 21st day of September, 1929.

(SEAL) JOSEPHINE C. WHITING,
Notary Public.
(My commission expires March 25, 1932.)

DIRECTORY

Byllesby Engineering and Management Corporation

231 S. La Salle Street
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New York Pittsburgh San Francisco

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NATURAL GAS ENGINEERS
COMPRESSOR PLANT DESIGN AND CONSTRUCTION
P. O. BOX 669 LONG BEACH, CALIFORNIA

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CONSULTING NATURAL GAS ENGINEER
ATHLETIC CLUB BUILDING, DALLAS

SMITH-EMERY CO.
Chemists—Engineers
Established 1910
Analyses and tests. Represent Pittsburgh Testing Laboratory for inspection at Eastern foundries, mills and shops.
Offices & Laboratories
920 Santee St. Los Angeles
651 Howard St. San Francisco

WESTERN GAS from time to time receives requests from manufacturers asking to be put in touch with capable men or organizations in the Southwest or on the Pacific Coast who are able to effectively market their products in the western gas industry.

We also receive requests for suggestions from men or selling organizations covering the Pacific Coast as well as the Mid-Continent section, who desire to extend their activities in this industry by taking on new products or additional lines.

If we can be of service to you in this way, get in touch with any one of our three offices—Los Angeles, 124 West Fourth Street; Dallas, 307 Thomas Bldg.; San Francisco, 447 Sutter Street.

Wedgewood

Since 1882

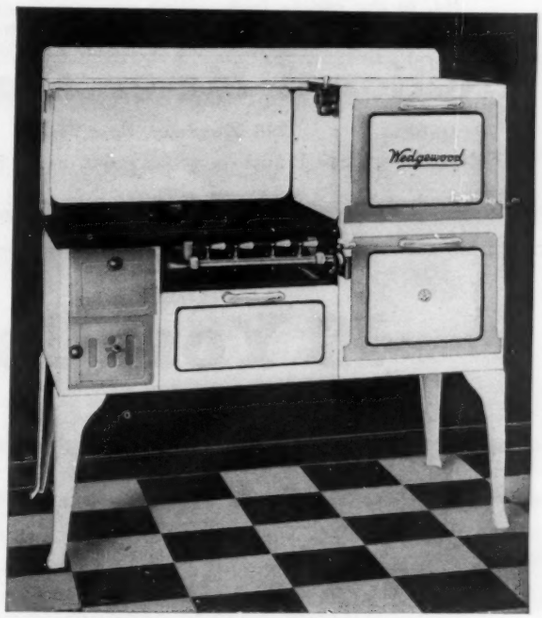
The All-Inclusive GAS LINE

Embracing
GAS STOVES AND RANGES
COMBINATION RANGES
RESTAURANT GAS RANGES
GAS PLATES — WATER HEATERS
GAS HEATERS

FEATURING
Eminently Superior

De Luxe

All Porcelain Enamel Models



With the famous Blue Star—4-Burner

CLOSED TOP

Hear Ann Holden's Thanksgiving Dinner Recipes

Listen to the Wedgewood Program every Tuesday at 11:10 a.m., KGO, KPO, KFI, KGW, KHQ, KOMO.

JAMES GRAHAM MFG. CO.
LARGEST STOVE MANUFACTURERS IN THE WEST
WHATEVER THE STOVE REQUIREMENT THERE IS A WEDGEWOOD TO FIT THE NEED.
San Francisco Los Angeles Newark, Calif.

EMPIRE
Oil Meters

Positive Displacement
Oscillating Piston Type

Simple in Construction—Easy to Operate—Low in Cost of Maintenance

EMPIRE meters are highly accurate, and **stay** accurate. They are invaluable for cracking and absorption processes; for gas companies; for refiners and distributors of gasoline and all distillates of petroleum; for measurement of crude oil, cold or hot.

ALL SIZES ⅝" TO 6"

Standard meters will withstand working pressures of 150 lbs. to the square inch. High pressure types will handle 300 lbs. Higher pressures and special types to order.

National Meter Company

299 Broadway, New York

1048 Folsom Street, San Francisco **645 Santa Fe Avenue, Los Angeles**

If You Use
FIRE BRICK

there is, in our line, a Fire Brick that is especially suitble for the special requirements of your particular plant.

CONSULT OUR EXPERTS

GLADDING, McBEAN & CO.

San Francisco - Oakland - Fresno

Los Angeles - Portland - Seattle

Spokane

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $5.00 monthly on 12-time contract.

HELP WANTED—MALE

WANTED—Young single man with engineering and operating experience in the natural gas and petroleum industry to install pressure and temperature controlling instruments. Fine opportunities for promotion and travel throughout all districts where oil refineries are located or natural gas used. Write for appointment for interview, stating age, education, experience and salary desired. Address B-93, *Western Gas*, 124 West Fourth Street, Los Angeles, Calif.

SITUATION WANTED—MALE

Young married man, 24 years of age, gas meter and general utility man, of six years experience, desires connection in Southern California or Arizona. Can give best of references. Address B-94, *Western Gas*, 124 West Fourth Street, Los Angeles, Calif.

"BLUE BLAZE" ISSUES FORT WORTH GAS COMPANY NUMBER

The October issue of "The Blue Blaze," Lone Star employee publication, was dedicated to the Fort Worth Gas Company, a subsidiary of the Lone Star, in honor of the opening of the new office of the company. Frank Jackson was editor of this number, which contained a number of features on the application of natural gas, among them by Wesley F. Wright, general manager of the Fort Worth Gas Company; C. K. Fletcher, secretary-treasurer of the company, and Frank Jackson, industrial engineer.

CITIES SERVICE COMPANY AWARDS CONTRACT FOR NEBRASKA LINE

Cities Service Company has awarded to the Truman-Smith Construction Company of El Dorado, Kansas, the contract for the construction of the Atchison, Kansas, to Falls City, Nebraska, line of the company. Atchison, Horton, Hiawatha and Sabetha, Kansas, and Falls City, Nebraska, will be supplied from the line. Construction is to begin at once.

J. E. HUSTON, OF CONNERSVILLE COMPANY, DIES

Joseph E. Huston, secretary and treasurer of the Connersville Blower Company, died on October 20, 1929, following an acute attack of heart trouble. Mr. Huston was one of the founders of the Connersville Company. He was also president of the Lincoln Manufacturing Company at the time of his death.

CALIF NATURAL GASOLINE ASS'N. TO HOLD ANNUAL BANQUET

The California Natural Gasoline Association will hold its annual banquet at the Los Angeles Biltmore Hotel, November 14, 1929.

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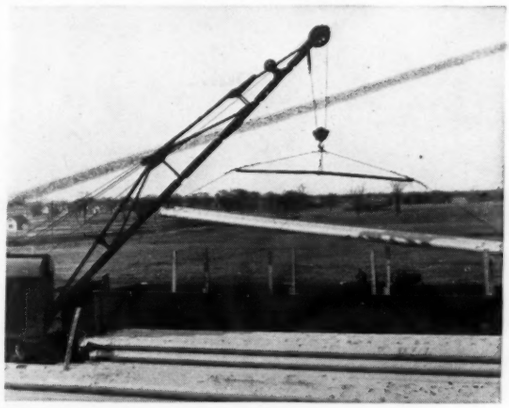

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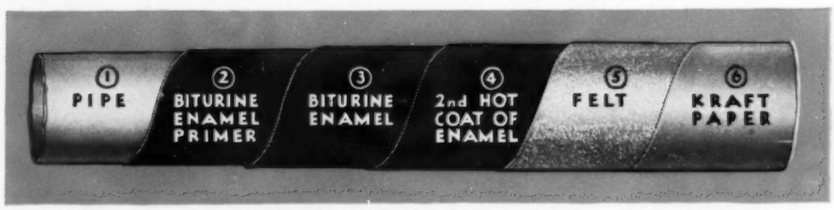

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